SECTION 1 — GENERAL INFORMATION

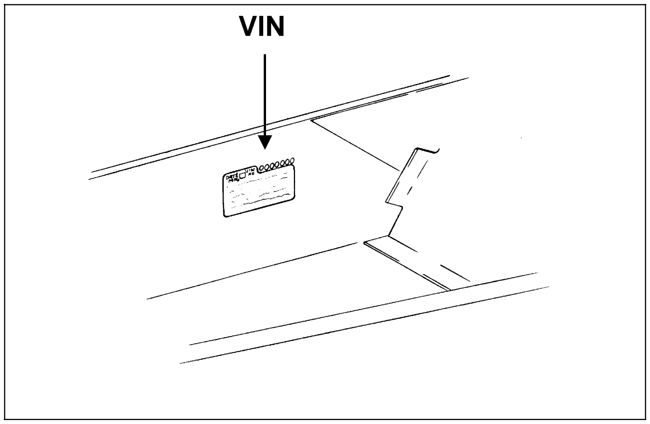
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Snowmobile Identification

The Arctic Cat Snowmobile has several identification numbers. The Vehicle Identification Number (VIN) is stamped into the tunnel near the right-side footrest (Fig. 1). The Engine Serial Number (ESN) is stamped into the crankcase of the engine. The Engine Model Number is located on the engine magneto housing.

Fig. 1-1



0726-383

These numbers are required to complete warranty claims properly. No warranty will be allowed by Arctic Cat Inc. if the engine serial number or VIN is removed or mutilated in any way.

Recommended Gasoline and Oil

Recommended Gasoline (Carbureted Models)

The recommended gasoline to use in these snowmobiles is 87 minimum octane regular unleaded. In many areas, oxygenates (either ethanol or MTBE) are added to the gasoline. Oxygenated gasolines containing up to 10% ethanol or up to 15% MTBE are acceptable gasolines; however, whenever using oxygenated gasolines, the carburetor main jet must be one size larger than the main jet required for regular unleaded gasoline. For example, if a 400 main jet is recommended for regular unleaded gasoline, a 410 main jet must be installed if using an oxygenated gasoline.

When using ethanol blended gasoline, it is not necessary to add a gasoline antifreeze since ethanol will prevent the accumulation of moisture in the fuel system.

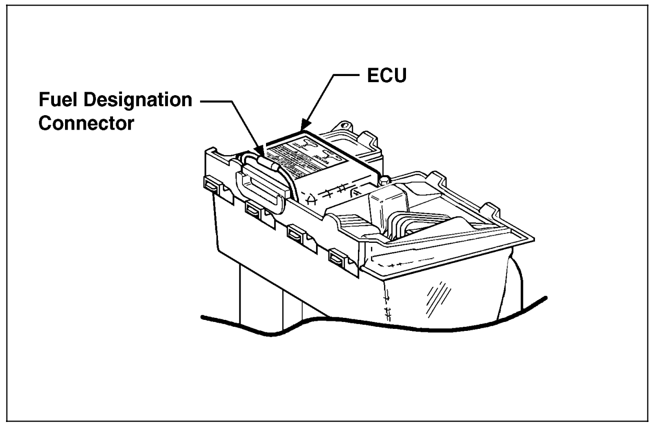
⚠ CAUTION

Do not use white gas or gasolines containing methanol. Only Arctic Cat approved gasoline additives should be used.

Recommended Gasoline (EFI Models)

The recommended gasoline to use in these snowmobiles is 87 minimum octane regular unleaded, and the Fuel Designation Connector at the ECU must be connected. In many areas, oxygenates (either ethanol or MTBE) are added to the gasoline. Oxygenated gasolines containing up to 10% ethanol or up to 15% MTBE are acceptable gasolines; however, if oxygenated gasoline is used, the Fuel Designation Connector at the ECU must be disconnected. Do not use gasolines containing methanol.

Fig. 1-2



734-482A

⚠ CAUTION

Do not use white gas or gasoline containing methanol. Only Arctic Cat approved gasoline additives should be used.

⚠ CAUTION

If oxygenated gasoline is to be used, it is extremely important that the Fuel Designation Connector at the ECU is disconnected. If the connector is not disconnected when using oxygenated gasoline, severe engine damage may occur.

■ **NOTE: In order for the ECU to change modes, the engine must be OFF when connecting or disconnecting the Fuel Designation Connector.**

Recommended Oil

The recommended oil to use in the oil-injection system is Arctic Cat 50:1 Injection Oil. This oil is specially formulated to be used either as an injection oil or as a pre-mix oil (for carbureted model break-in) and meets all of the lubrication requirements of the Arctic Cat snowmobile engine.

⚠ CAUTION

Any oil used in place of the recommended oil could cause serious engine damage.

Break-In Procedure

The Arctic Cat engine (when new or rebuilt) requires a short break-in period before the engine is subjected to heavy load conditions. Arctic Cat requires that the first tankful of fuel be premixed at a 100:1 ratio in all carbureted oil-injection models; however, Arctic Cat does not recommend any premixed fuel be used during break-in period for EFI models.

⚠ CAUTION

On EFI models, DO NOT use premixed fuel in the snowmobile gas tank. Engine damage will occur.

During the break-in period, a maximum of 1/2 throttle is recommended; however, brief full-throttle accelerations and variations in driving speeds contribute to good engine break-in.

⚠ CAUTION

On carbureted models, DO NOT exceed the one (1) tankful limitation of a 100:1 gas/oil break-in mixture. Continuous use of a gas/oil mixture, unless consistently operating in extremely cold conditions (-26°C/-15°F or colder), could cause spark plug fouling and excessive carbon buildup. A 100:1 gas/oil mixture must be used in conjunction with the oil-injection system to ensure adequate engine lubrication in extremely cold conditions.

Genuine Parts

When replacement of parts is necessary, use only genuine Arctic Cat parts. They are precision-made to ensure high quality and correct fit.

High Altitude Operation

Operating a snowmobile at varying altitudes requires changes in performance components. These changes affect drive train components (on all models) and carburetion components (on carbureted models).

A high altitude information decal is located beneath the hood of the snowmobile. On carbureted models, the information is incorporated into the Main Jet Chart decal.

⚠ CAUTION

On carbureted models, carefully follow the Main Jet Chart recommendations for proper main jet selection for altitude, temperature, and gasoline being used.

A number of Arctic Cat snowmobiles are initially set up at the factory for operation between 5000-9000 feet. Consult the appropriate specifications for this information.

Preparation For Storage

Prior to storing the snowmobile, it must be properly serviced to prevent corrosion and component deterioration. An authorized Arctic Cat Snowmobile dealer should perform this service; however, the owner/operator can perform this service if desired. To prepare the snowmobile for storage, Arctic Cat recommends the following procedure:

1. Clean the seat cushion with a damp cloth and Arctic Cat Vinyl Protectant (p/n 0638-313).

2. Clean the snowmobile thoroughly by hosing dirt, oil, grass, and other foreign matter from the skid frame, tunnel, hood, and belly pan. Allow the snowmobile to dry thoroughly. DO NOT get water into any part of the engine.

3. Place the rear of the snowmobile up on a shielded safety stand.

■ **NOTE: On some models, the air-intake silencer is a one-piece unit, and the silencer boot(s) can be removed to access the intake bore(s). Remove the boots; then proceed to step 7.**

■ **NOTE: On some models, the air-intake silencer includes a cover/tool tray assembly and a baffle/resonator, and the silencer boot cannot be removed to access the intake bores. Proceed to step 4.**

4. Open the air-intake silencer cover; then remove the 3 Phillips-head screws securing the cover/tool tray assembly to the silencer.

5. Close the cover; then tip the cover/tool tray assembly forward and out of its slots and remove the assembly.

6. Using a large flat-blade screwdriver, remove the baffle/resonator tabs from the air-intake silencer slots and remove the baffle/resonator to access the intake bores.

■ **NOTE: The baffle/resonator can be removed more easily by removing the back tabs first.**

7. Start the engine and allow to idle. With the engine idling, spray Arctic Cat Engine Storage Preserver (p/n 0636-177) into the intake(s) until the engine exhaust starts to smoke heavily or until the engine starts to drop in RPM. Turn engine off.

■ **NOTE: On some models, install the air-intake silencer boot(s); on some models, install the baffle/resonator and the cover/tool tray assembly.**

8. Plug the exhaust system outlet with a clean cloth.

9. With the ignition switch in the OFF position:

   A. Disconnect the high tension leads from the spark plugs; then remove the plugs, connect them to the leads, and ground them on the cylinder heads.

⚠ CAUTION

Never crank the engine over without grounding the spark plugs. Damage to coils and/or CDI unit may result.

   B. Pour 29.5 ml (1 fl oz) of SAE #30 petroleum-based oil into each spark plug hole and pull the recoil starter handle slowly about 10 times.

   C. Install the spark plugs and connect the high tension leads.

10. On carbureted models, drain the gas from each carburetor float chamber.

11. Fill the gas tank to its rated capacity; then add Arctic Cat Fuel Stabilizer (p/n 0638-165) to the gas tank following directions on the container for the stabilizer/gasoline ratio. Tighten the gas tank cap securely.

12. Drain the chain-case lubricant by removing the chain-case drain plug located on the backside of the chain-case assembly. Remove the chain-case cover and inspect chain, sprockets, chain tensioner, and rollers for wear and the chain for proper tension. Install the drain plug, chain-case cover, and seal; then pour Arctic Cat Transmission Lube (p/n 0636-817) into the filler hole according to appropriate specifications.

13. Remove the drive belt from the drive clutch/driven pulley. Lay the belt on a flat surface or slide it into a cardboard sleeve to prevent warping or distortion during storage.

14. Clean and inspect the drive clutch and driven pulley.

15. Apply light oil to the upper steering post bushing, ski spindles and bolts, front and rear pivot bushings of the skid frame, and plungers of the shock absorbers.

16. Lubricate the front and rear suspension, spindles, and speedometer drive adapter with a low-temperature grease.

17. Tighten all nuts, bolts, and cap screws making sure all calibrated nuts, bolts, and cap screws are tightened to specifications. Make sure all rivets holding the components together are tight. Replace all loose rivets.

18. Clean and polish the hood, console, and chassis with Arctic Cat Hood and Windshield Cleaner/Polish (p/n 0636-174). DO NOT USE SOLVENTS OR SPRAY CLEANERS. THE PROPELLANT WILL DAMAGE THE FINISH.

19. On electric start models, disconnect the battery cables making sure to disconnect the negative cable first; then clean the battery posts and cables.

20. If possible, store the snowmobile indoors. Raise the track off the floor by blocking up the back end making sure the snowmobile is secure. Loosen the track adjusting bolts to reduce track tension. Cover the snowmobile with a machine cover or a heavy tarpaulin to protect it from dirt and dust.

21. If the snowmobile must be stored outdoors, position the snowmobile out of direct sunlight; then block the entire snowmobile off the ground making sure the snowmobile is secure. Loosen the track adjusting bolts to reduce track tension. Cover with a machine cover or a heavy tarpaulin to protect it from dirt, dust, and rain.

⚠ CAUTION

Avoid storing in direct sunlight and using a plastic cover as moisture may collect on the snowmobile causing corrosion.

Preparation After Storage

Taking the snowmobile out of storage and correctly preparing it for another season will assure many miles and hours of trouble-free snowmobiling. Arctic Cat recommends the following procedure:

⚠ CAUTION

On carbureted models if the gas in each carburetor float chamber was not drained prior to storage, the carburetor(s) must be cleaned before starting the engine.

1. Clean the snowmobile thoroughly. Polish the exterior of the snowmobile.
2. Clean the engine. Remove the cloth from the exhaust system. Check exhaust system and air-intake silencer for obstructions.
3. Inspect all control wires and cables for signs of wear or fraying. Replace if necessary. Use cable ties or tape to route wires and cables away from hot or rotating parts.
4. Inspect the drive belt for cracks and tears. Check belt specifications. Replace if damaged or worn. Install the drive belt.

■ NOTE: If the old belt is worn but in reasonable condition, retain it with the snowmobile as a spare in case of emergency.

5. On carbureted models, inspect the in-line fuel filter and replace if necessary.
6. Inspect all fuel hoses and oil hoses for deterioration or cracks; replace if necessary. Make sure all connections are tight; then fill the oil-injection reservoir with 50:1 injection oil.

■ NOTE: On carbureted models after prolonged storage, Arctic Cat recommends one tankful of 100:1 gas/oil mixture be used in conjunction with the oil-injection system to ensure proper lubrication.

7. Inspect the entire brake system, all controls, headlight, taillight, brakelight, ski wear bars, and headlight aim; adjust or replace as necessary.
8. Inspect the spark plugs. Replace, gap, or clean as necessary.
9. Adjust the track to the proper tension and alignment. Lock the jam nuts.
10. Adjust the carburetor(s) and choke cable on carbureted models and throttle cable on all models.

⚠ CAUTION

On VM-style carburetors, be sure to tighten the swivel adapter jam nuts securely. If a jam nut isn't tightened, the adjuster can rotate out of the carburetor cap causing the piston valve not to return to the full-closed position.

11. Tighten all nuts, bolts, and cap screws making sure all calibrated nuts, bolts, and cap screws are tightened to specifications.
12. Lubricate the rear suspension, spindles, and speedometer drive adapter with a low-temperature grease.
13. On liquid cooled models, check the coolant level and all coolant hoses and connections for deterioration or cracks. Add properly mixed coolant as necessary.
14. On fan cooled models, clean the engine cooling fins and vents.
15. On EFI models, place the rear of the snowmobile on a shielded safety stand; then start the engine. Allow the engine to idle; then using a long stiff wire with a hooked end, raise the oil-injection pump control arm to the wide-open position until the engine starts to smoke heavily. Release the control arm and turn off the engine.
16. On electric start models, charge the battery; then connect the battery cables making sure to connect the positive cable first. Test the electric start system.

After Break-In Checkup (100 Miles)

The 100 mile checkup offered by some dealerships reduces problems and warranty costs. A program of this kind should be offered by all dealerships. Many dealerships have added the price of the checkup into the selling price of the snowmobile, and others offer it as a bonus to the customers who purchase snowmobiles from their dealership.

There are three areas that require adjustment after the break-in period in order to obtain peak performance. These areas are the following.

A. Carburetor jetting

B. Drive belt deflection

C. Track tension and alignment

Carburetor Jetting - Altitude, temperature, and the use of oxygenated gasoline affect the carburetion needed for optimum engine performance. The carburetor main jets must be changed in conjunction with changes in operating altitude, oxygenated gasoline usage, and temperature.

Drive Belt Deflection - Drive belt deflection is very important to the snowmobile. Even if it is checked and is correct when the snowmobile is set up, it does change (more so during the break-in period). This is because the rubber engine mounts and the rubber snubber on the torque link will all take a "set" during the first 100 miles, which allows the distance between the drive clutch and driven pulley to shorten. When this happens, the snowmobile will appear to have a too long drive belt. To add to this, the drive belt itself wears and stretches somewhat. This all leads to a low-end performance problem and, if not corrected, causes premature drive belt wear.

After the break-in period, drive belt deflection should be checked according to the instructions given in this manual. To correct for too much deflection, washer(s) from between the driven pulley sheaves can be removed to "tighten the drive belt" and allow the belt to return to the proper ratio for drive clutch engagement.

Drive Belt Break-In - It is critical for maximum drive belt life to allow the belt to break in before subjecting it to hard use such as wide-open-throttle operation or hill climbing.

The first 20 miles on the drive belt should be at 1/2 throttle or lower. This will allow the belt to cure totally before it is subjected to hard use.

If this procedure isn't followed, it is possible to destroy a new drive belt in less than 50 miles. This should be explained to customers at the time of drive belt sales.

To increase the life of a drive belt, it is very important that the belt be warmed up before subjecting it to any type of use. In cold temperature (0° or below), the engine should be allowed to idle for a period of 8 to 10 minutes. This will allow heat from the engine compartment to soften the drive belt. Not only will this procedure increase belt life but will also help prevent engine damage from cold seizure.

⚠ WARNING

When following the above procedure, the operator must not leave the snowmobile unattended during the warm-up period.

Each operator should be instructed to drive the snowmobile for several minutes at a low throttle setting to warm the belt up before using wide-open-throttle. This practice should be followed on all models for maximum belt life.

Track Tension and Alignment - There is a certain amount of stretch on all tracks during the first 500 miles. The track must be adjusted after the first 50 to 100 miles to the specifications given in the Setup and Predelivery Manual and periodically thereafter. If these adjustments aren't performed, the track may "derail" which leads to track and slide rail damage.

Along with these three major areas, there are also other areas that should be checked and adjusted during the "After Break-In Checkup." A checklist to assist you with this service follows. Not only will the customer be happier, but it also gets the customer back into your dealership, which in many cases will mean additional sales in accessories, belts, oil, etc.

After Break-In Checkup Checklist

Below is a recommended list of items to check after the break-in period. By performing this inspection, warranty cost can be reduced and customer satisfaction can be increased.

The recommended mileage for this inspection is between 100 and 300 miles. Please encourage the customers to have this important checkup done.

- ❏ Jet carburetor(s) according to average temperature, type of gasoline being used, and altitude
- ❏ Adjust drive belt deflection
- ❏ Adjust track tension and alignment
- ❏ Adjust throttle cable tension
- ❏ Check oil-injection pump adjustment
- ❏ Check engine idle
- ❏ Check coolant level
- ❏ Check chain case lubricant level
- ❏ Check lights (high-low beam, brakelight)
- ❏ Check safety switch operation
- ❏ Check driveshaft area for any rubbing components
- ❏ Check steering hardware for tightness
- ❏ Check skid frame and A-arm mounting hardware for tightness
- ❏ Check brake lever travel and adjustment
- ❏ Grease all lubrication points

Torque Conversions

kg-m x 7.235 = ft-lb
ft-lb x 0.1383 = kg-m

ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m
1	0.1	21	2.9	41	5.7	61	8.4	81	11.2
2	0.3	22	3.0	42	5.8	62	8.6	82	11.3
3	0.4	23	3.2	43	5.8	63	8.7	83	11.5
4	0.6	24	3.3	44	6.1	64	8.9	84	11.6
5	0.7	25	3.5	45	6.2	65	9.0	85	11.8
6	0.8	26	3.6	46	6.4	66	9.1	86	11.9
7	1.0	27	3.7	47	6.5	67	9.3	87	12.0
8	1.1	28	3.9	48	6.6	68	9.4	88	12.2
9	1.2	29	4.0	49	6.8	69	9.5	89	12.3
10	1.4	30	4.2	50	6.9	70	9.7	90	12.5
11	1.5	31	4.3	51	7.1	71	9.8	91	12.6
12	1.7	32	4.4	52	7.2	72	10.0	92	12.8
13	1.8	33	4.6	53	7.3	73	10.1	93	12.9
14	1.9	34	4.7	54	7.5	74	10.2	94	13.0
15	2.1	35	4.8	55	7.6	75	10.4	95	13.1
16	2.2	36	5.0	56	7.7	76	10.5	96	13.3
17	2.4	37	5.1	57	7.9	77	10.7	97	13.4
18	2.5	38	5.3	58	8.0	78	10.8	98	13.6
19	2.6	39	5.4	59	8.2	79	10.9	99	13.7
20	2.8	40	5.5	60	8.3	80	11.1	100	13.8

Fraction/Decimal Conversion Chart

8ths	16ths	32nds	64ths	64ths (cont)
1/8 = .125	1/16 = .0625	1/32 = .03125	1/64 = .015625	33/64 = .515625
1/4 = .250	3/16 = .1875	3/32 = .09375	3/64 = .046875	35/64 = .546875
3/8 = .375	5/16 = .3125	5/32 = .15625	5/64 = .078125	37/64 = .578125
1/2 = .500	7/16 = .4375	7/32 = .21875	7/64 = .109375	39/64 = .609375
5/8 = .625	9/16 = .5625	9/32 = .28125	9/64 = .140625	41/64 = .640625
3/4 = .750	11/16 = .6875	11/32 = .34375	11/64 = .171875	43/64 = .671875
7/8 = .875	13/16 = .8125	13/32 = .40625	13/64 = .203125	45/64 = .703125
—	15/16 = .9375	15/32 = .46875	15/64 = .234370	47/64 = .734375
—	—	17/32 = .53125	17/64 = .265625	49/64 = .765625
—	—	19/32 = .59375	19/64 = .296875	51/64 = .796875
—	—	21/32 = .65625	21/64 = .328125	53/64 = .828125
—	—	23/32 = .71875	23/64 = .359375	55/64 = .859375
—	—	25/32 = .78125	25/64 = .390625	57/64 = .890625
—	—	27/32 = .84375	27/64 = .421875	59/64 = .921875
—	—	29/32 = .90625	29/64 = .453125	61/64 = .953125
—	—	31/32 = .96875	31/64 = .484375	63/64 = .984375

Drill Bit Sizes (Number) Chart

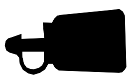
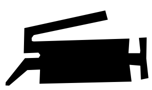
No.	Size of Drill in Inches	No.	Size of Drill in Inches	No.	Size of Drill in Inches	No.	Size of Drill in Inches
1	.2280	21	.1590	41	.0960	61	.0390
2	.2210	22	.1570	42	.0935	62	.0380
3	.2130	23	.1540	43	.0890	63	.0370
4	.2090	24	.1520	44	.0860	64	.0360
5	.2055	25	.1495	45	.0820	65	.0350
6	.2040	26	.1470	46	.0810	66	.0330
7	.2010	27	.1440	47	.0785	67	.0320
8	.1990	28	.1405	48	.0760	68	.0310
9	.1960	29	.1360	49	.0730	69	.0292
10	.1935	30	.1285	50	.0700	70	.0280
11	.1910	31	.1200	51	.0670	71	.0260
12	.1890	32	.1160	52	.0635	72	.0250
13	.1850	33	.1130	53	.0595	73	.0240
14	.1820	34	.1110	54	.0550	74	.0225
15	.1800	35	.1100	55	.0520	75	.0210
16	.1770	36	.1065	56	.0465	76	.0200
17	.1730	37	.1040	57	.0430	77	.0180
18	.1695	38	.1015	58	.0420	78	.0160
19	.1660	39	.0995	59	.0410	79	.0145
20	.1610	40	.0980	60	.0400	80	.0135

MM/IN. Conversion Chart

mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
.01	.00039	.41	.01614	.81	.03189	21	.82677	61	2.40157
.02	.00079	.42	.01654	.82	.03228	22	.86614	62	2.44094
.03	.00118	.43	.01693	.83	.03268	23	.90551	63	2.48031
.04	.00157	.44	.01732	.84	.03307	24	.94488	64	2.51968
.05	.00197	.45	.01772	.85	.03346	25	.98425	65	2.55905
.06	.00236	.46	.01811	.86	.03386	26	1.02362	66	2.59842
.07	.00276	.47	.01850	.87	.03425	27	1.06299	67	2.63779
.08	.00315	.48	.01890	.88	.03465	28	1.10236	68	2.67716
.09	.00354	.49	.01929	.89	.03504	29	1.14173	69	2.71653
.10	.00394	.50	.01969	.90	.03543	30	1.18110	70	2.75590
.11	.00433	.51	.02008	.91	.03583	31	1.22047	71	2.79527
.12	.00472	.52	.02047	.92	.03622	32	1.25984	72	2.83464
.13	.00512	.53	.02087	.93	.03661	33	1.29921	73	2.87401
.14	.00551	.54	.02126	.94	.03701	34	1.33858	74	2.91338
.15	.00591	.55	.02165	.95	.03740	35	1.37795	75	2.95275
.16	.00630	.56	.02205	.96	.03780	36	1.41732	76	2.99212
.17	.00669	.57	.02244	.97	.03819	37	1.45669	77	3.03149
.18	.00709	.58	.02283	.98	.03858	38	1.49606	78	3.07086
.19	.00748	.59	.02323	.99	.03898	39	1.53543	79	3.11023
.20	.00787	.60	.02362	1.0	.03937	40	1.57480	80	3.14960
.21	.00827	.61	.02402	1	.03937	41	1.61417	81	3.18897
.22	.00866	.62	.02441	2	.07874	42	1.65354	82	3.22834
.23	.00906	.63	.02480	3	.11811	43	1.69291	83	3.26771
.24	.00945	.64	.02520	4	.15748	44	1.73228	84	3.30708
.25	.00984	.65	.02559	5	.19685	45	1.77165	85	3.34645
.26	.01024	.66	.02598	6	.23622	46	1.81102	86	3.38582
.27	.01063	.67	.02638	7	.27559	47	1.85039	87	3.42519
.28	.01102	.68	.02677	8	.31496	48	1.88976	88	3.46456
.29	.01142	.69	.02717	9	.35433	49	1.92913	89	3.50393
.30	.01181	.70	.02756	10	.39370	50	1.96850	90	3.54330
.31	.01220	.71	.02795	11	.43307	51	2.00787	91	3.58267
.32	.01260	.72	.02835	12	.47244	52	2.04724	92	3.62204
.33	.01299	.73	.02874	13	.51181	53	2.08661	93	3.66141
.34	.01339	.74	.02913	14	.55118	54	2.12598	94	3.70078
.35	.01378	.75	.02953	15	.59055	55	2.16535	95	3.74015
.36	.01417	.76	.02992	16	.62992	56	2.20472	96	3.77952
.37	.01457	.77	.03032	17	.66929	57	2.24409	97	3.81889
.38	.01496	.78	.03071	18	.70866	58	2.28346	98	3.85826
.39	.01535	.79	.03110	19	.74803	59	2.32283	99	3.89763
.40	.01575	.80	.03150	20	.78740	60	2.36220	100	3.93700

Servicing Symbols

Listed in the table below are symbols indicating special instructions and other important information necessary for proper servicing. Please note the definition for each symbol. These symbols are used throughout this two-volume set.

SYMBOL	DESCRIPTION
	Torque control required
	243 - apply blue Loctite #243 (p/n 1048-028) 270 - apply green Loctite #270 (p/n 1048-030)
	Lubricate with Arctic Cat 50:1 Injection Oil (p/n 0636-286)
	Lubricate with Arctic Cat Low Temp Grease (p/n 0636-593)
	3B - Three Bond Sealant (p/n 0636-070) HT - High-Temp Sealant (p/n 0636-069) AS - Anti-Seize Thread Compound (p/n 0678-146)

SECTION 2 — ENGINE

2

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Engine

This engine servicing section has been organized into sub-sections which show a progression for the complete servicing of the Arctic Cat engine. For consistency purposes, this section shows a complete and thorough progression; however, for efficiency it may be preferable to remove the engine as a complete assembly, to remove and disassemble only those components which need to be addressed, and to service only those components. The technician should use discretion and sound judgment.

■ **NOTE: Some photographs used in this section are used for clarity purposes only and are not designed to depict actual conditions.**

Removing Engine Table of Contents

60 cc Model 2-2
Twin F/C Models 2-3
440 LC/500/580/600 Twin/700 cc Models 2-5
550 cc Models 2-7
Triple Models 2-9

Removing Engine (60 cc Model)

1. Remove the cap screw securing the hood cable to the engine.
2. Remove the two sheet metal screws securing the chain guard to the console and tunnel.

Fig. 2-1



A940

3. Disconnect the connecting link in the drive chain; then remove the drive chain.
4. Remove the cap screw and rubber mount securing the brake band to the brake assembly bracket. Account for a spacer and a washer.

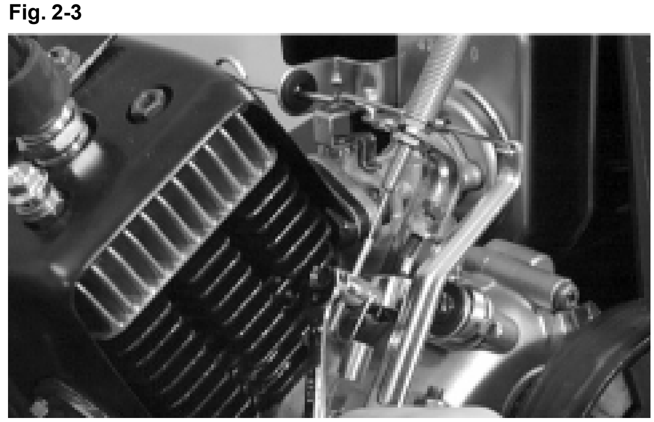
Fig. 2-2



A951

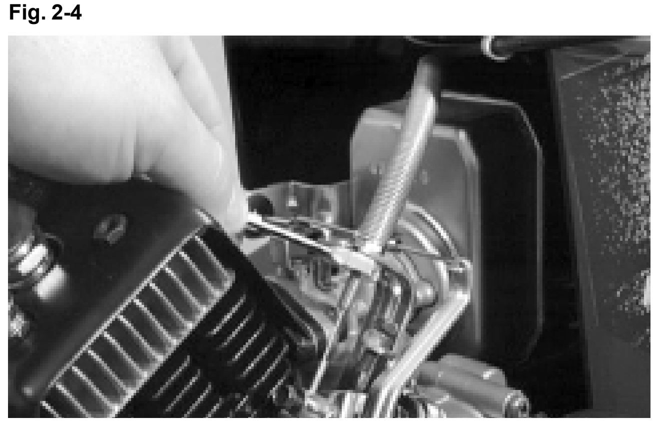
5. Remove the brake band assembly.
6. Loosen the throttle cable set screw; then loosen the throttle cable jam nut and remove the throttle cable.

Fig. 2-3



A954

Fig. 2-4



A953

7. Disconnect the engine wiring harness from the main wiring harness.

Fig. 2-5



A957

8. From beneath the front end, remove the four cap screws securing the engine to the front end. Account for the washers and lock washers.

Fig. 2-6



A958

9. Remove the engine assembly.

Removing Engine
(Twin F/C Models)

■ **NOTE: If equipped with electric start, disconnect the battery.**

1. Turn the gas tank shut-off valve to the CLOSED position.

2. Open the belt guard.

3. Remove the drive belt; then remove the plug from the belly pan.

■ **NOTE: Before installing the clutch puller, apply oil to the threads of the puller and a small amount of grease to the tip of the puller.**

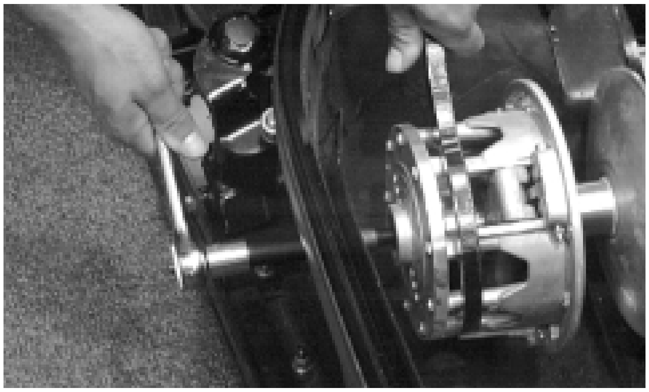
4. Remove the bolt and lock washers securing the drive clutch to the crankshaft; then using the Drive Clutch Puller (p/n 0644-207) and an impact wrench or a breaker bar and Drive Clutch Spanner Wrench (p/n 0644-136), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller with a hammer. Repeat this procedure until the clutch releases.

Fig. 2-7



AF472D

Fig. 2-8



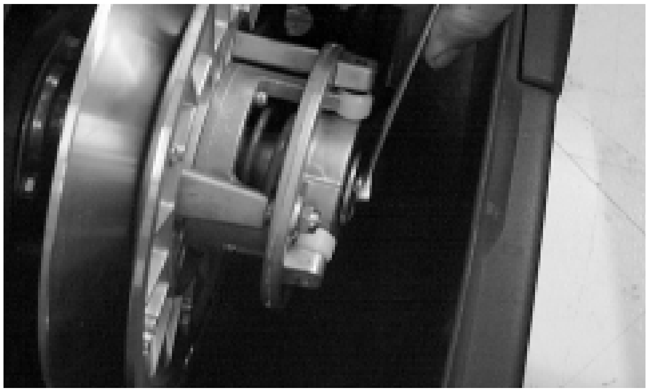
AF476D

5. Remove the clutch from the engine compartment.

6. Remove the cap screw and washer securing the driven pulley; then slide the pulley off the driven shaft. Account for and note the position of any alignment washers.

■ **NOTE: If the driven pulley will not slide off the driven shaft, use the Driven Pulley Puller (p/n 0744-023) for removal.**

Fig. 2-9



SC013D

7. Remove the torque bumper. Account for any engine mount shims.

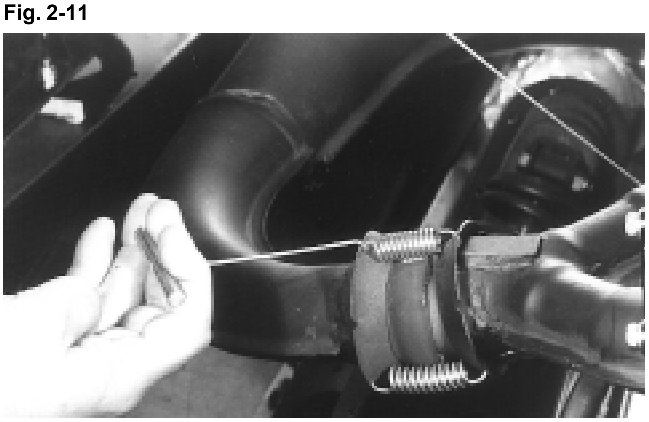
Fig. 2-10



AF473D

8. Remove the springs securing the expansion chamber to the exhaust manifold and resonator; then remove expansion chamber.

Fig. 2-11



AC067

9. Remove the cap screws and lock washers securing the recoil starter; then remove the starter. Leave it in the engine compartment.

Fig. 2-12



AB082

10. Disconnect the four-prong main wiring harness connector and the CDI unit wiring harness.

11. Disconnect the impulse hose from the crankcase.

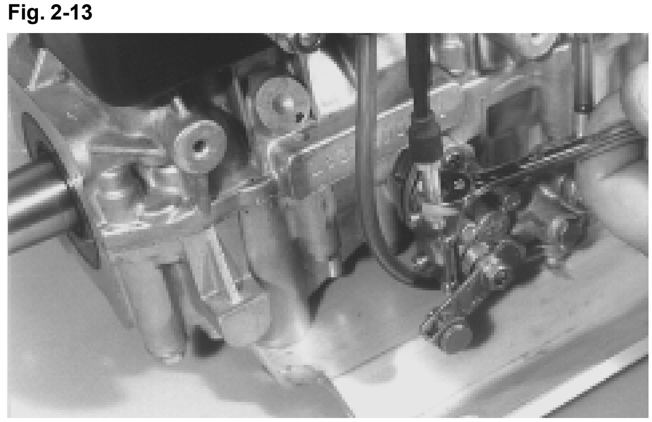
12. Disconnect the spark plug caps.

13. Loosen the carburetor flange clamp(s). Remove the carburetor(s) from the intake flange(s) and carburetor boot(s). Place the carburetor(s) to the side in an upright position.

■ **NOTE: If equipped with electric start, remove the lock nuts and washers securing the starter motor to the engine mounting bracket and remove the starter motor.**

14. Disconnect the oil-injection cable from the oil-injection pump. Account for the E-clip and washer; then disconnect the oil supply hose from the pump and plug the hose to prevent leakage.

Fig. 2-13



AB081

■ **NOTE: If equipped with electric start, remove the two lock nuts and washers securing the starter motor bracket; then remove the three remaining cap screws, washers, and lock washers securing the starter motor bracket and ground cable. Remove the starter motor bracket.**

15. On the Bearcat models, remove the four cap screws securing the engine plate to the front end. Account for four washers, female mounts, and cup washers.

Fig. 2-14

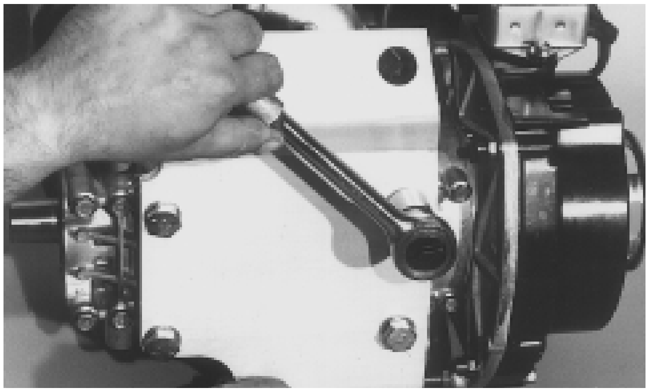


AL201D

16. On the Bearcat models, lift the engine w/plate out of the engine compartment.

17. On the Bearcat models, remove the cap screws securing the plate assembly to the engine; then separate the engine and plate.

Fig. 2-15



AB007

18. On the Panther/Z models, remove the cap screws securing the engine to the front end. Account for washers, cap screws, and lock nuts.

19. On the Panther/Z models, lift the engine out of the engine compartment.

20. On the Panther/Z models, remove the cap screws, washers, and lock washers securing the engine mounting brackets to the engine; then remove the brackets.

Removing Engine (440 LC/ 500/580/600 Twin/700 cc Models)

■ **NOTE: If applicable, disconnect the battery cables.**

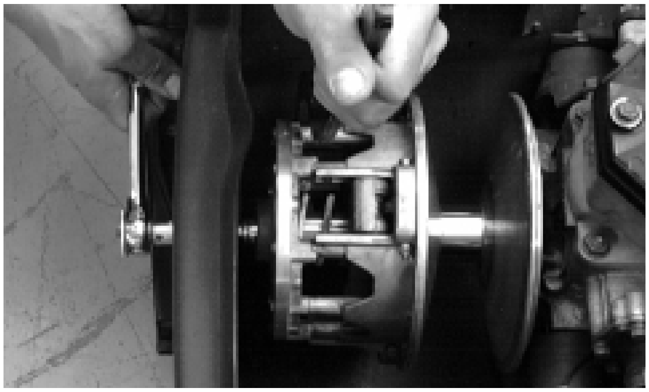
1. Turn the gas tank shut-off valve to the CLOSED position.

2. Remove all springs securing the expansion chamber(s) and remove the expansion chamber(s) from the engine compartment.

3. Open the belt guard; then remove the drive belt.

4. Remove the plug from the belly pan. Using a ½-in. 12-point socket, remove the cap screw and lock washer securing the drive clutch to the crankshaft; then using Clutch Puller (p/n 0644-207) and an impact wrench or a breaker bar and Spanner Wrench (p/n 0644-136), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller. Repeat this step until the clutch releases. Remove the drive clutch. If applicable, account for the two sleeves.

Fig. 2-16



AN380D

5. Remove the cap screw and washer securing the driven pulley; then slide the driven pulley off the driven shaft. Account for a key, stub shaft, and alignment washers.

Fig. 2-17



AF120D

■ **NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**

6. If applicable, remove the machine screw and washer securing the mounting plate (for the ignition coil and fuel pump) to the air-intake silencer.

Fig. 2-18



AN613D

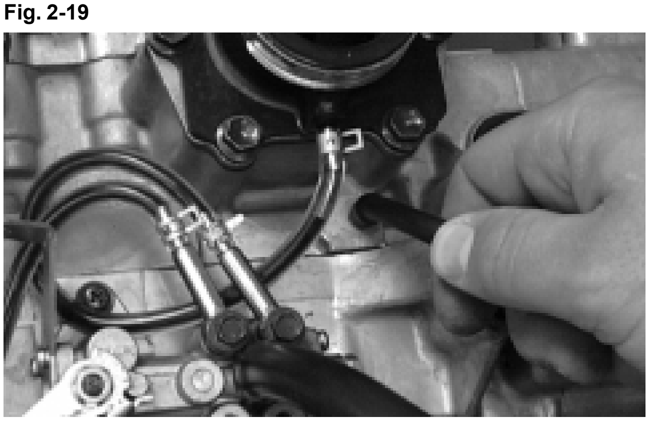
■ **NOTE: On the 700 cc models, lift the air-intake silencer; then move the silencer forward and out of the engine compartment.**

7. Remove the screws securing the air-intake silencer; then move the silencer forward and out of the engine compartment.

8. Loosen the flange clamps securing the throttle body/carburetor to the flange; then remove the throttle body/carburetor. Place them to one side in an upright position.

9. On carbureted models, disconnect the impulse hose from the crankcase.

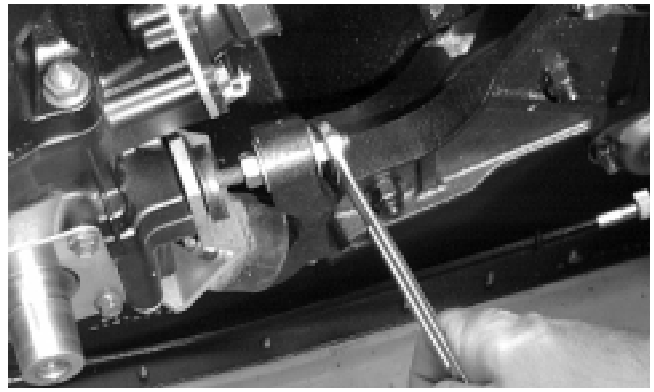
Fig. 2-19



AN385D

10. Loosen the engine torque bumper and remove the left rear engine nut and washer.

Fig. 2-20



AN610D

11. Secure the hood with a tie-down strap; then remove the hood cable.

12. Remove the exhaust manifold from the engine. Account for nuts, washers, and gaskets.

13. Disconnect all electrical wires from the engine.

14. Remove the E-clip and washer securing the oil-injection cable; then disconnect the oil-injection cable from the oil-injection pump. Disconnect the oil-supply hose from the pump and plug the hose to prevent oil drainage.

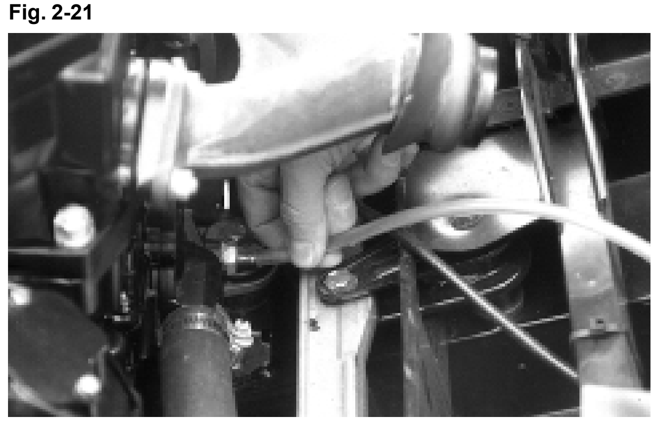
15. Remove the recoil starter from the engine. Leave it in the engine compartment.

■ **NOTE: If applicable, disconnect the solenoid-to-starter motor cable from the starter motor.**

16. Loosen the cap screws/lock nuts securing the engine mounting brackets to the front end.

17. Lift the engine up and attach a long piece of fuel hose to the engine coolant drain (located on the exhaust side of the engine). Route the hose outside the engine compartment and into a container. Open the drain and remove the filler cap. Once the coolant stops flowing, remove the hose and tighten the drain valve.

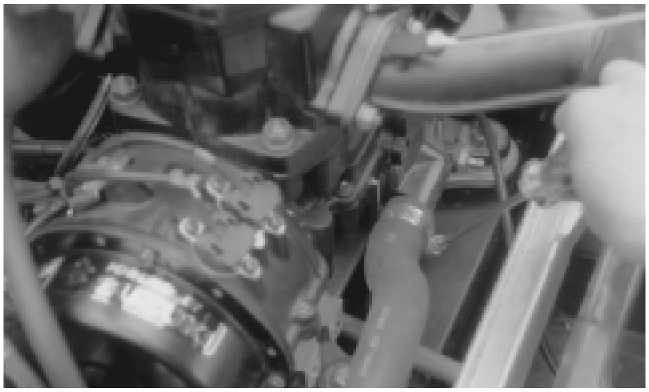
Fig. 2-21



AP058

18. Raise the engine up slightly; then loosen the clamp securing the supply hose to the water pump housing and remove the hose from the water pump. Loosen the clamp securing the hose to the thermostat cap; then remove the hose from the cap.

Fig. 2-22



AN143

■ **NOTE: Inspect the engine to ensure all wires, hoses, and cables have been removed.**

19. Lift the engine with mounting brackets out of the engine compartment.

20. Remove the cap screws securing the engine mounting brackets to the crankcase; then remove the brackets.

Removing Engine (550 cc Models)

1. Disconnect the battery cables making sure to disconnect the negative cable first.

2. Turn the gas tank shut-off valve to the CLOSED position.

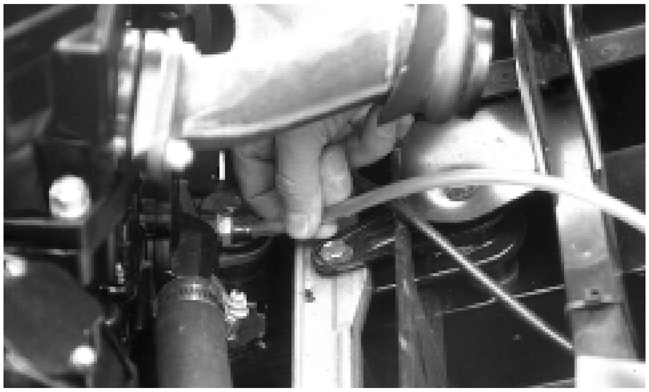
3. Remove the cable tie and positive battery cable from the starter motor.

4. On the Wide Track, remove the two lock nuts securing the starter motor to the engine mounting bracket; then place the starter motor and end cap off to the side.

5. Remove the springs securing the expansion chamber to the exhaust manifold, front end, and resonator. Remove the expansion chamber and grafoil gasket.

6. Attach a long piece of fuel hose to the engine coolant drain (located on the exhaust side of the engine). Route the hose outside the engine compartment and into a container. Open the drain and remove the filler cap. Once the coolant stops flowing, remove the hose and tighten the drain valve.

Fig. 2-23



AP058

7. Open the belt guard: then remove the drive belt.

■ **NOTE: On the Wide Track, remove the machine screws securing the side panel to the belly pan; then remove the side panel. On the Panther 550 and ZL 550, remove the rubber plug from the belly pan.**

Fig. 2-24



AM115D

8. Using a ½-in. twelve-point socket, remove the bolt and lock washer securing the drive clutch to the crankshaft. Using the Clutch Puller (p/n 0644-207) and an impact wrench or a breaker bar and the Flywheel Pulley/Spanner Wrench (p/n 0144-310), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller. Repeat this step until the clutch releases. Remove the drive clutch. If applicable, account for the two sleeves.

■ **NOTE: On the Wide Track, remove the lock nut securing the belly pan and bumper to the bumper support tube; then remove the rear plug from the belly pan.**

2

Fig. 2-25



AF459D

9. Remove the cap screw and washer securing the driven pulley; then slide the driven pulley off the driven shaft. Account for a key and alignment washers.

Fig. 2-26



AF120D

■ **NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**

10. Loosen the flange clamp securing each carburetor to its flange; then remove the carburetors. Position the carburetors to one side in an upright position.

Fig. 2-27



AJ172

11. Disconnect the impulse hose from the crankcase.

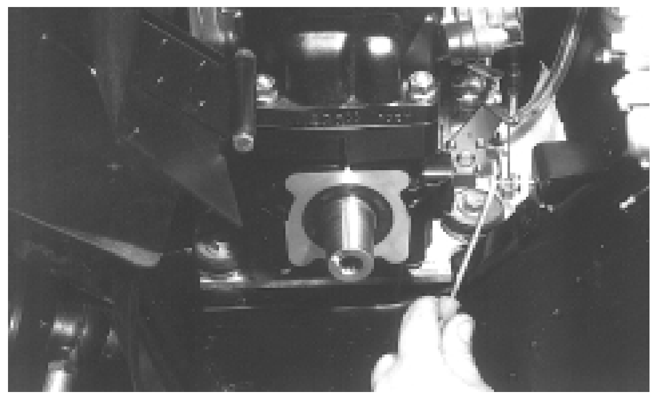
12. Remove the cable tie securing the engine and CDI wiring harnesses to the engine; then disconnect the main wiring harness from the engine and CDI wiring harnesses.

13. Remove the spark plug caps and the cable tie securing the temperature-gauge sender wire; then disconnect the sender wire.

14. On the Wide Track, remove the ground wire from the magneto housing.

15. Remove the E-clip and washer securing the oil-injection cable; then disconnect the oil-injection cable from the pump. Disconnect the oil-supply hose from the pump and plug the hose to prevent oil drainage.

Fig. 2-28



AN009

16. Loosen the clamp securing the supply hose to the water pump housing; then remove the hose from the water pump. Loosen the clamp securing the hose to the thermostat cap; then remove the hose from the cap.

17. Remove the four cap screws and lock washers securing the recoil starter; then remove the starter from the engine. Leave it in the engine compartment.

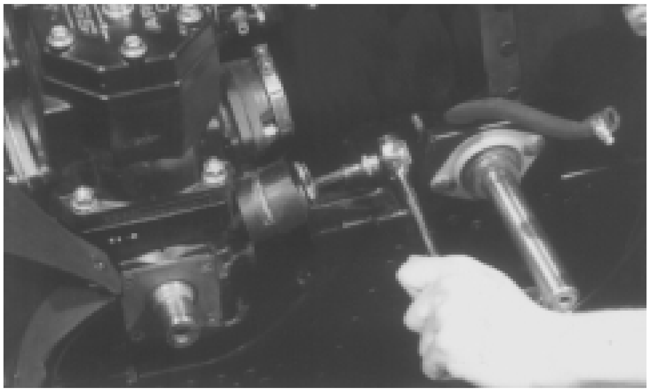
■ **NOTE: On the Panther 550, account for the ground wire.**

18. Support the hood; then remove the hood cable from the exhaust manifold.

19. Remove the mounting hardware securing the engine to the front end.

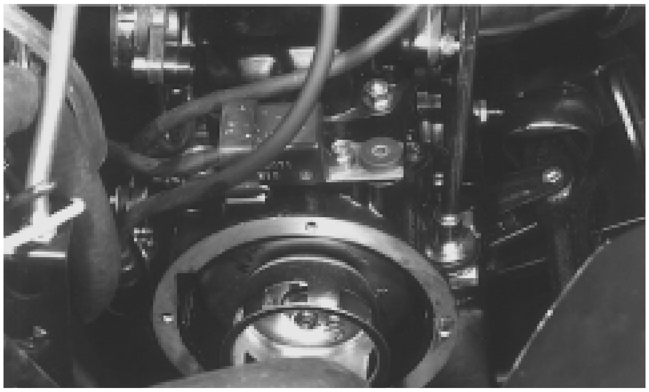
■ **NOTE: On the Wide Track, account for shims and note their position on the left rear engine mount for assembly purposes.**

Fig. 2-29



AR321

Fig. 2-30



AN013

20. Lift the engine with mounting brackets out of the engine compartment.

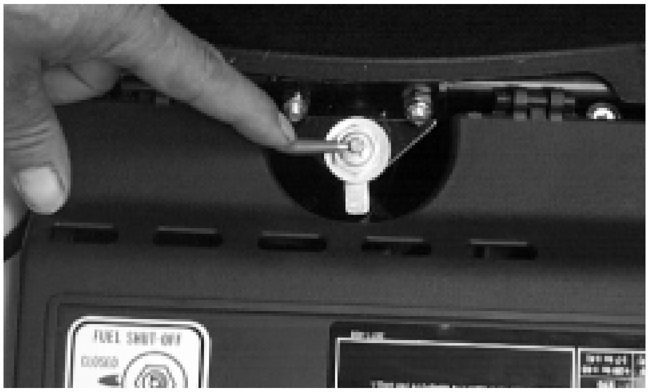
> ⚠ **CAUTION**
>
> **Do not use the starter motor shaft to lift the engine. Damage may occur.**

21. Remove the engine mounting brackets.

Removing Engine
(Triple Models)

1. Turn the gas tank shut-off valve to the CLOSED position.

Fig. 2-31



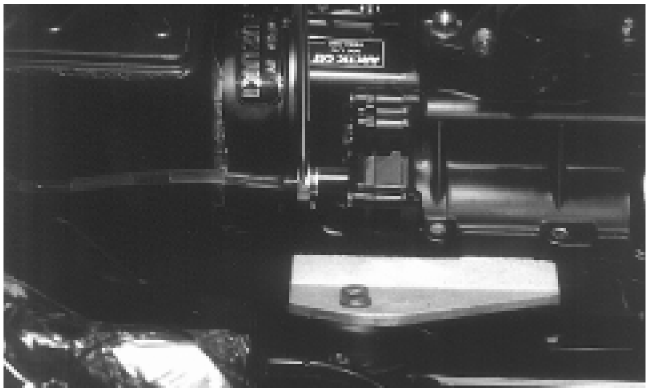
AL658D

2. Secure the hood with a hold-down strap; then remove the hood cable.
3. Remove the springs securing the expansion chambers to the header pipes, the front end, and the resonator. Remove the expansion chambers and three grafoil gaskets.

■ **NOTE: Number the expansion chambers before removing to aid in assembly.**

4. Remove the cap screws securing the resonator. Account for and note the location of the engine ground cable with star washer, washers, bushings, spacers, and retaining nuts.
5. Attach a long piece of fuel hose to the engine coolant drain. Route the hose outside the engine compartment and into a container. Open the drain valve; then remove the coolant filler cap to vent the system. Once the coolant stops flowing, remove the hose and tighten the drain valve.

Fig. 2-32



AQ123

6. Open the belt guard; then remove the drive belt.

2

7. Remove the plug from the belly pan; then using a 1/2 in. twelve-point socket, remove the bolt and lock washer securing the drive clutch to the crankshaft. Using the Drive Clutch Puller (p/n 0644-207) and an impact wrench or a breaker bar and Spanner Wrench (p/n 0644-136), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller. Repeat this step until the clutch releases. Remove the drive clutch. If applicable, account for the two sleeves.

Fig. 2-33



AF472D

8. Remove the cap screw securing the driven pulley; then slide the driven pulley off the driven shaft. Account for a stub shaft, the location of all washers, and a key.

Fig. 2-34

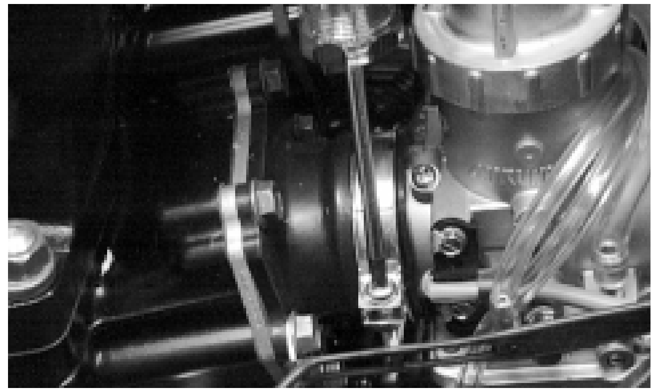


SC013D

■ **NOTE: If the driven pulley is tight on the shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**

9. Label the carburetors. Loosen the flange clamp securing each carburetor to its flange; then remove the carburetors from the intake flanges. Position the carburetors to one side in an upright position.

Fig. 2-35

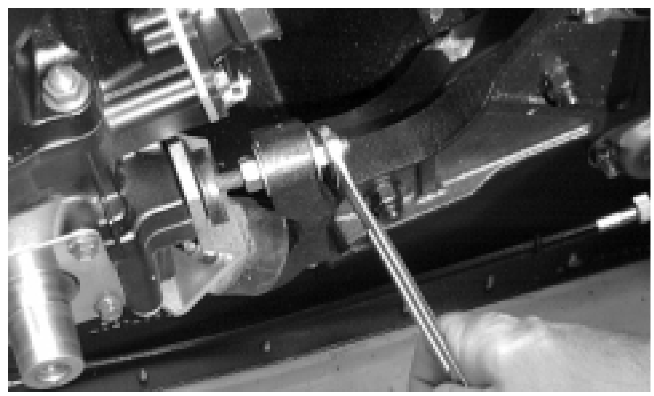


AN614D

10. Disconnect the impulse hose from the crankcase.

11. Loosen the engine torque bumper; then remove the left-side rear engine nut and washer.

Fig. 2-36



AN610D

12. Disconnect the engine and timing sensor wiring harnesses from the main wiring harness. Remove the spark-plug caps from the spark plugs. Remove the cap screw securing the two ground wires to the magneto housing cover.

13. Remove the E-clip and washer securing the oil-injection cable; then disconnect the oil-injection cable from the oil-injection pump. Disconnect the oil-supply hose and the oil-output hose from the pump and plug the hoses to prevent oil drainage.

Fig. 2-37



AN392D

14. Loosen the clamp securing the coolant supply hose to the water pump housing; then remove the hose from the water pump. Loosen the clamp securing the hose to the thermostat cap; then remove the hose from the cap.

15. Disconnect the temperature-gauge sender wire.

Fig. 2-38

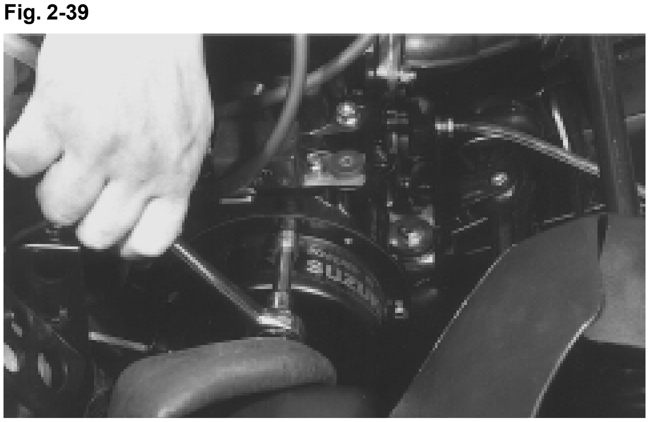


AJ663

16. Remove the cap screws securing the engine mounting brackets to the front end. Account for mounting hardware.

17. Lift the MAG-side of the engine. Remove the four cap screws and lock washers securing the recoil starter; then remove the starter from the engine. Leave it in the engine compartment.

Fig. 2-39



AN012

18. Lift the engine with engine mounting brackets out of the engine compartment.

19. Remove the mounting brackets from the crankcase.

Disassembling Engine Table of Contents

60 cc Model 2-11
F/C Models 2-16
440 LC/550 cc Models 2-19
500/580/600 cc Twin Models 2-22
700 cc Models 2-27
600 cc Triple Models 2-34
800/1000 cc Models 2-39

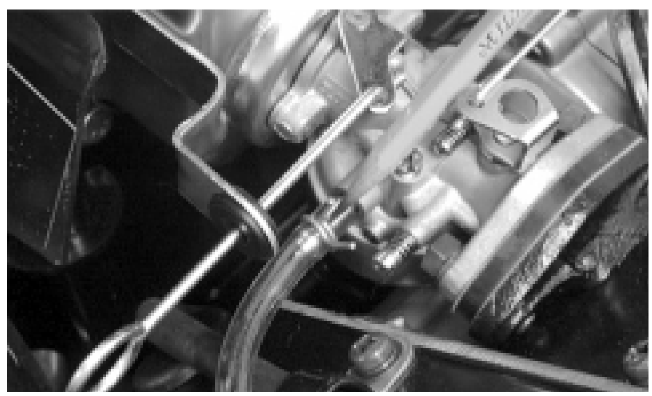
Disassembling Engine (60 cc Model)

2

FUEL TANK/CLUTCH

1. Remove the fuel supply hose from the carburetor body.

Fig. 2-40



A955

2. Loosen the machine screw securing the fuel tank bracket to the recoil starter housing; then remove the two machine screws securing the fuel tank bracket to the cylinder head and remove the fuel tank assembly.

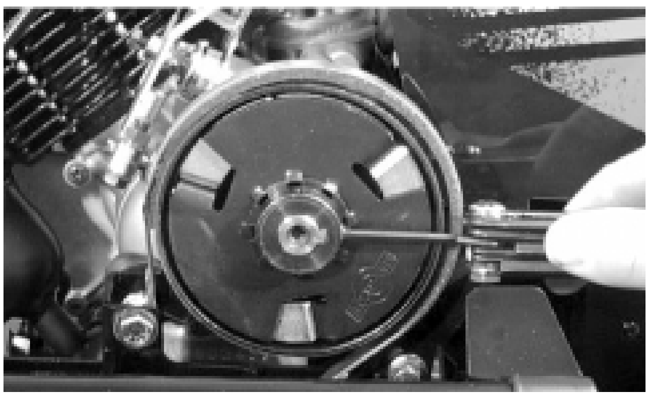
Fig. 2-41



A956

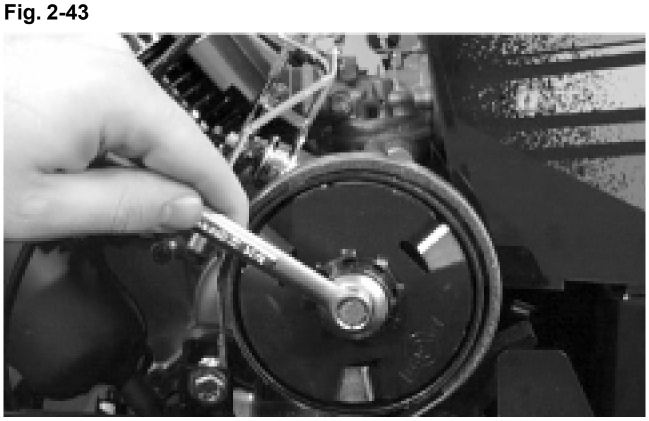
3. Loosen the set screw and remove the cap screw and washer securing the clutch to the engine primary shaft.

Fig. 2-42



A947

Fig. 2-43

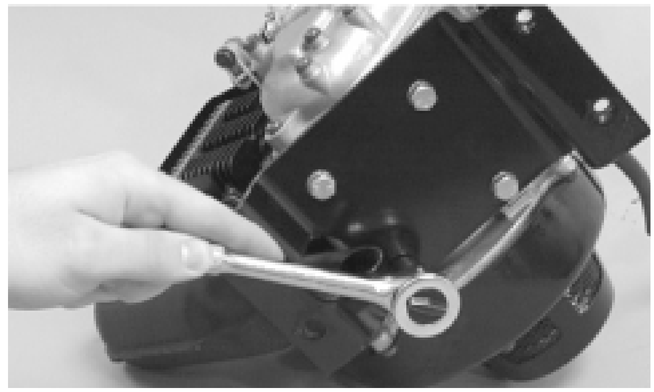


A946

4. Using a wheel puller, remove the clutch assembly from the primary shaft.

5. Remove the four cap screws securing the engine plate to the crankcase.

Fig. 2-44

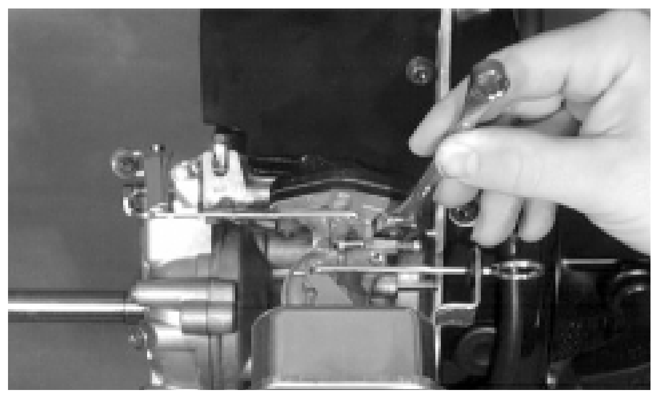


A900

FAN/CYLINDER HEAD

6. Remove the nuts and lock washers securing the carburetor. Slide the carburetor off intake studs; then disconnect the carburetor rod and rod spring.

Fig. 2-45

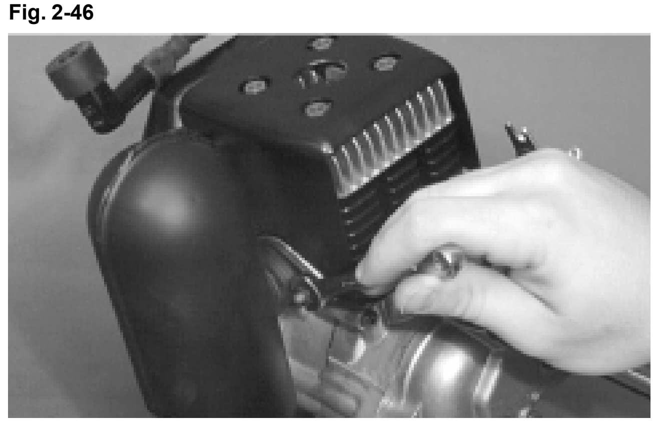


A779

7. Slide the gasket, insulator, and gasket off intake studs.

8. Remove the nuts and lock washers securing the muffler. Slide the muffler off the exhaust studs; then remove the exhaust gasket.

Fig. 2-46



A778

9. Remove the recoil starter.

10. Remove the screws securing the fan cover; then remove the cover.

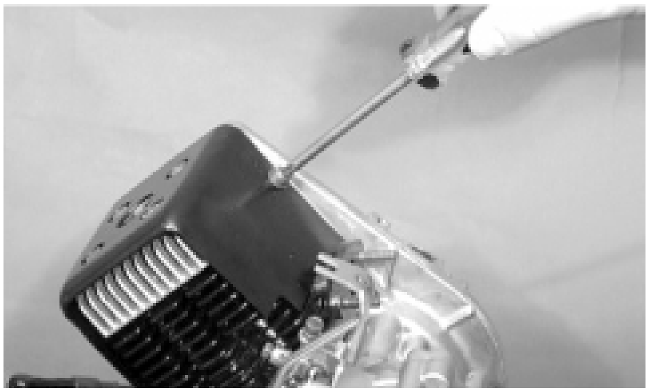
Fig. 2-47



A775

11. Remove the cylinder head cowling.

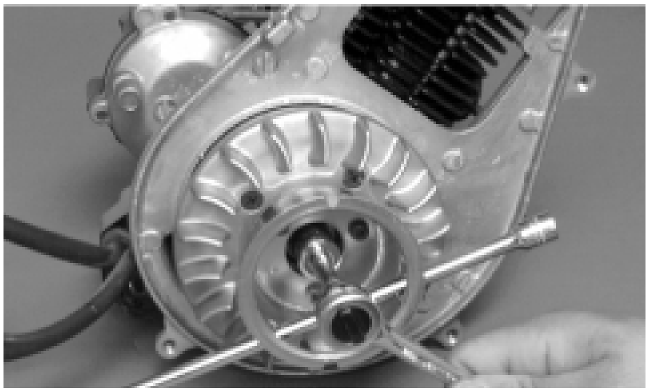
Fig. 2-48



A774

12. Using a flywheel holder (or a suitable substitute), remove the flywheel nut. Account for a lock washer and a washer.

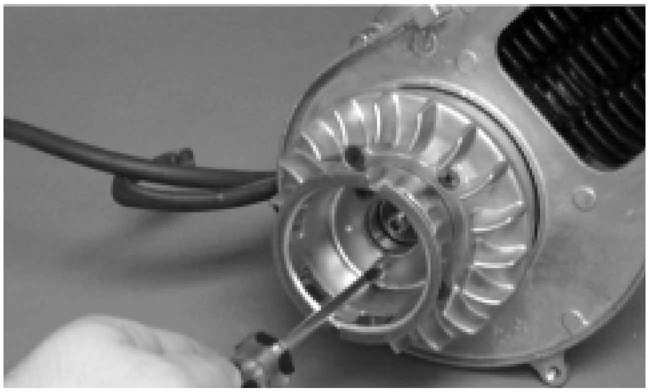
Fig. 2-49



A762

13. Remove the recoil starter pulley and spacer.

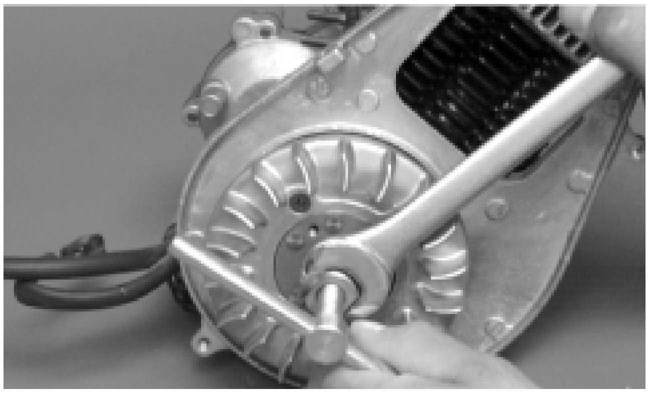
Fig. 2-50



A766

14. Using a flywheel puller, remove the flywheel. Account for the key.

Fig. 2-51



A761

15. Scribe a line on the stator plate and the crankcase for assembly purposes.

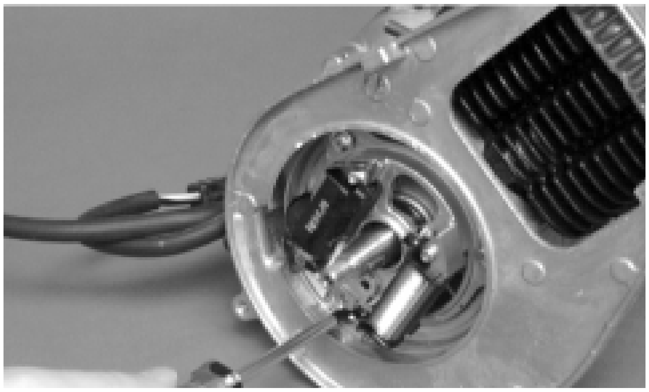
Fig. 2-52



A765

16. Remove the three screws securing the stator plate to crankcase.

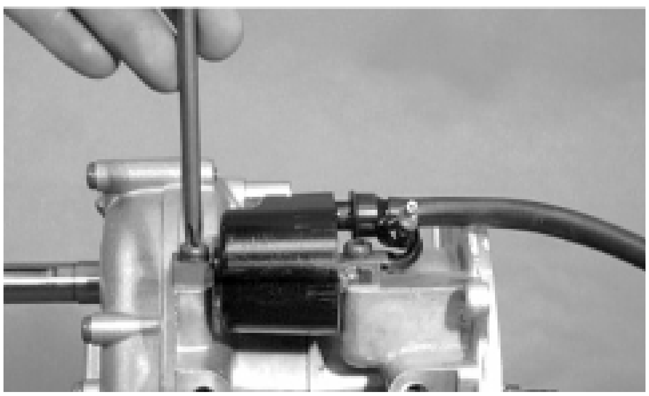
Fig. 2-53



A769

17. Disconnect the magneto lead from the ignition coil lead. Remove the screws securing the ignition coil; then remove the coil.

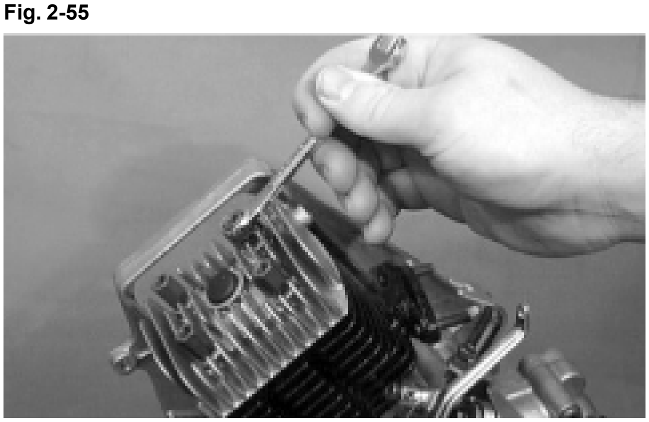
Fig. 2-54



A756

18. Remove the cylinder head nuts and washers; then lift the head off the cylinder studs.

Fig. 2-55



A939

19. Slide the head gasket off the cylinder studs.

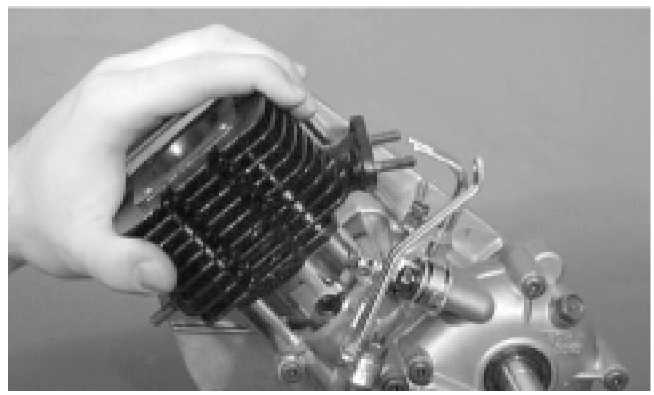
Fig. 2-56



A772

20. Slide the cylinder straight upward until free of the piston. Remove the base gasket.

Fig. 2-57



A771

21. Remove the piston pin circlips; then using the Piston Pin Puller (p/n 0644-328), remove the piston pin.

Fig. 2-58



A776

GEAR CASE/CRANKCASE

22. Using an impact screwdriver, remove the screws securing the gear case cover. Lift the cover off the crankcase.

Fig. 2-59

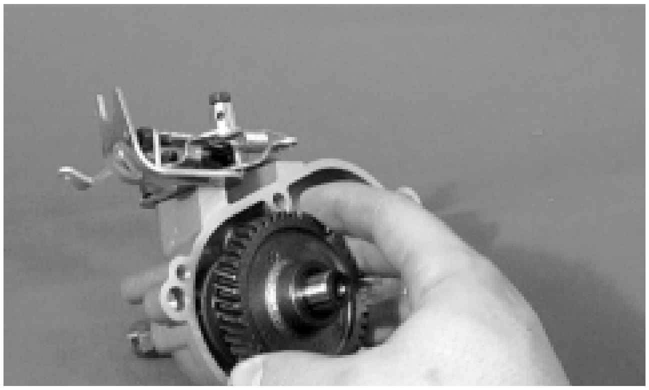


A755

23. Remove the cover gasket.

24. Remove the primary driven shaft and gear from the gear case.

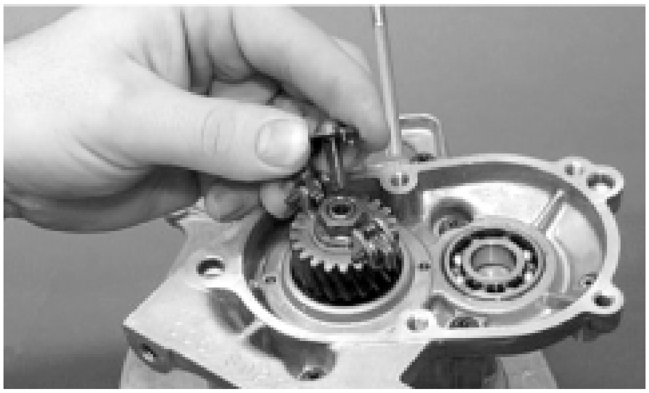
Fig. 2-60



A752

25. Remove the shifter from the end of the engine crankshaft.

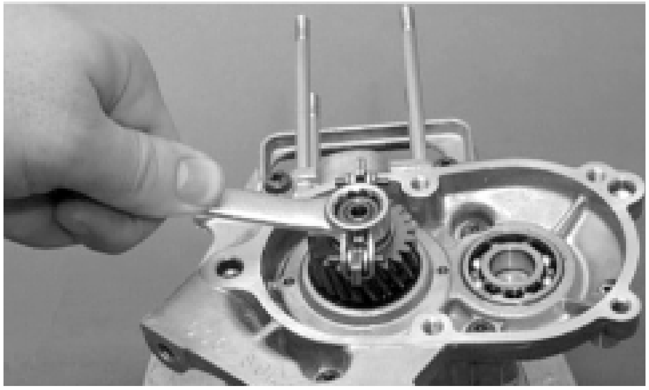
Fig. 2-61



A758

26. Remove the nut securing the primary drive gear and centrifugal to the crankshaft.

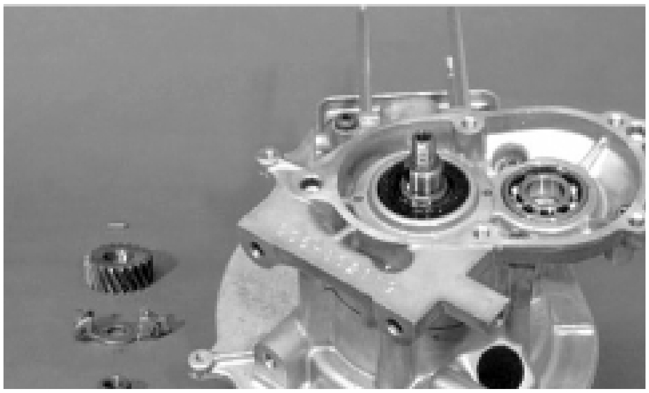
Fig. 2-62



A748

27. In order, remove the centrifugal, primary drive gear, and key from the crankshaft.

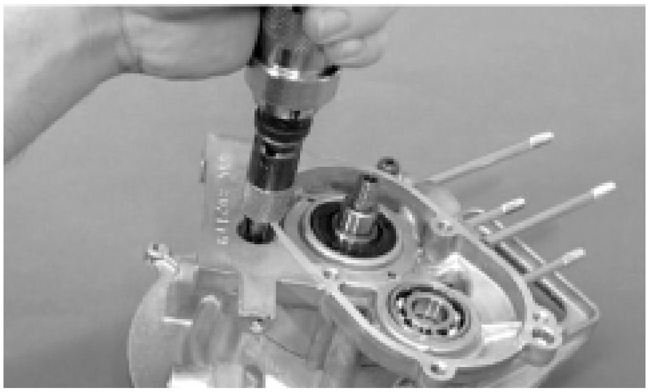
Fig. 2-63



A747

28. Using an impact screwdriver, remove the five screws securing the crankcase halves.

Fig. 2-64



A745

29. Carefully separate the crankcase halves.

⚠ CAUTION
DO NOT use a chisel, screwdriver, or any other instrument to pry crankcase halves apart. Any damage to the crankcase sealing area will cause an air leak resulting in severe engine damage.

2

Fig. 2-65



A742

30. Remove the crankshaft from the crankcase.

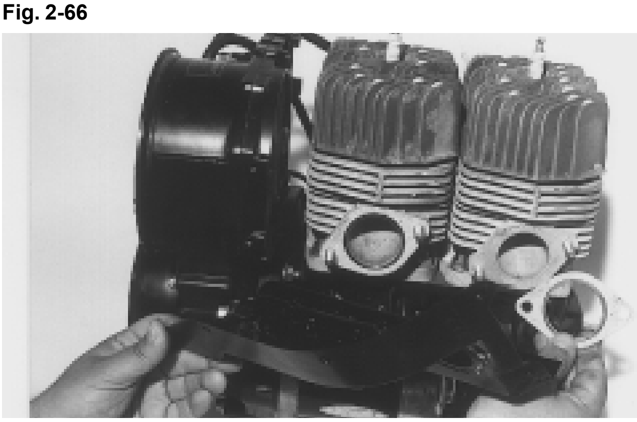
Disassembling Engine (F/C Models)

1. Remove the four nuts and lock washers securing the exhaust manifold; then remove the exhaust manifold. Account for two gaskets.

2. Noting the location of the longer cap screws for assembly purposes, remove the 14 cap screws, lock washers, and washers securing the top and exhaust-side cooling shrouds.

3. Lift the top cooling shroud off the engine and slide the exhaust-side cooling shroud off the exhaust-manifold studs. Account for two exhaust-manifold shroud gaskets.

Fig. 2-66



AB014

4. Disconnect the two oil-injection hoses from their fittings on the intake manifold (single carburetor) or on the adapter plates (twin carburetor).

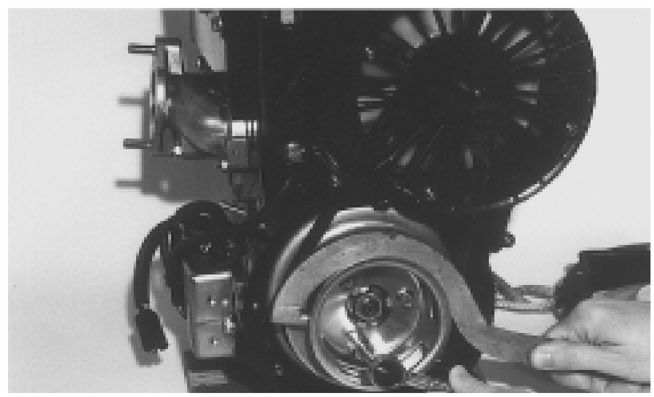
5. A. On the single carburetor model, remove the four nuts securing the intake manifold; then remove the manifold with flange from the engine. Account for two insulators. Discard the four gaskets.

   B. On the twin carburetor model, remove the four nuts, lock washers, and washers securing the intake flanges; then remove the flanges from the engine. Remove the six screws securing the adapter plates; then remove the adapter plates. Discard the two gaskets.

6. Remove the intake-manifold cooling shroud from the engine. Discard the two gaskets.

7. Using Flywheel Spanner Wrench (p/n 0144-007) to secure the crankshaft, remove the three cap screws and lock washers securing the starter pulley to the flywheel. Remove the starter pulley; then carefully pry the fan belt drive pulley from its seated position on the flywheel and remove.

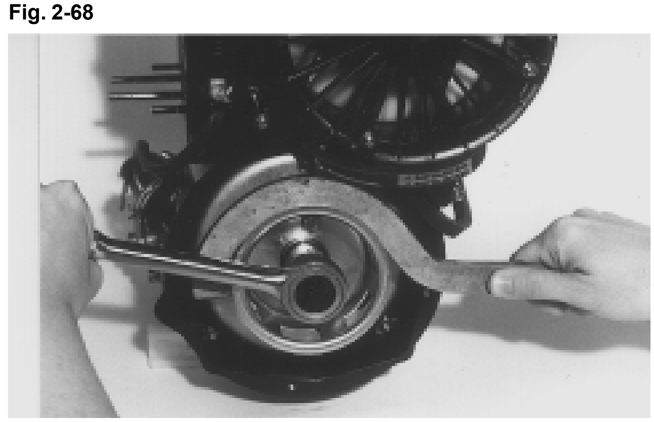
Fig. 2-67



AB020

8. Temporarily install the starter pulley on the flywheel with three cap screws. Using the flywheel spanner wrench to secure the crankshaft, loosen and remove the flywheel nut and washers.

Fig. 2-68



AB021

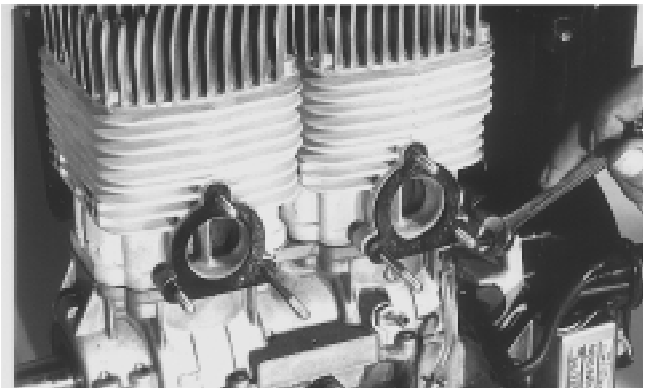
■ **NOTE: If an impact wrench is being used, use of a flywheel spanner wrench will not be necessary.**

9. Remove the cap screws securing the starter pulley to the flywheel and remove the pulley.

10. Remove the flange nuts securing the fan case to the crankcase; then remove the fan case.

■ **NOTE: For further servicing of the axial fan components, see section 3.**

Fig. 2-69

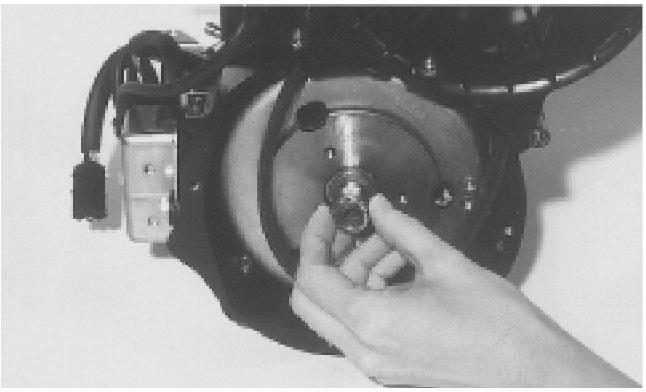


AB015

11. Install a protective cap onto the end of the crankshaft.

■ **NOTE: A suitable protective cap can be made by welding a 3 mm (1/8 in.) plate on one side of a spare flywheel nut.**

Fig. 2-70



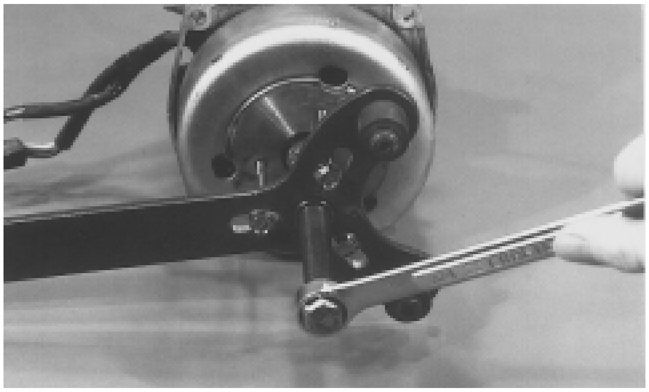
AB022

⚠ CAUTION

To prevent damage to the crankshaft, thread a protective cap onto the crankshaft. The puller must bottom on the cap and not on the crankshaft. Also, do not thread puller bolts more than 12.7 mm (1/2 in.) into the flywheel. Damage to the coils may result.

12. Using the Flywheel Puller/Spanner Wrench (p/n 0144-310) or suitable equivalent, remove the flywheel from the crankshaft by tightening the puller bolt, striking the head of the puller bolt with a hammer, and tightening again. Repeat procedure until the flywheel is free. Account for the key in the end of the crankshaft.

Fig. 2-71



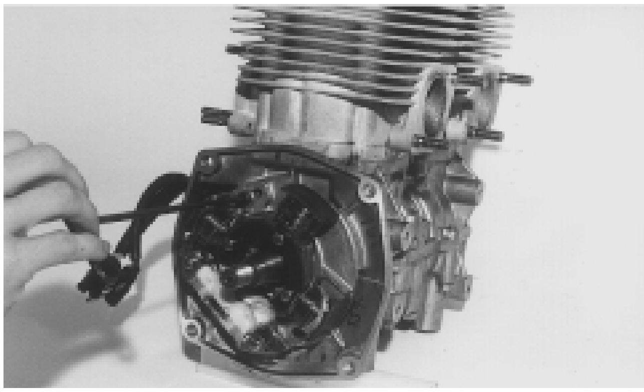
AB098

■ **NOTE: To ensure the cleanliness of the flywheel magnets, place the flywheel (with the magnets facing upward) on a clean bench.**

13. Scribe a reference line on the stator plate and crankcase to aid in assembly; then remove the two Allen-head cap screws, lock washers, and washers securing the stator plate.

■ **NOTE: The two stator plate Allen-head cap screws had Loctite applied to the threads during assembly. Before removing them, apply a sharp blow to the head of each screw to break the Loctite loose. If this isn't done, the screws can be very difficult to remove.**

Fig. 2-72



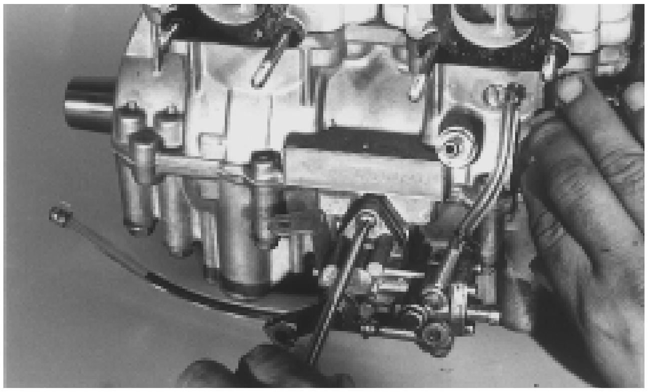
AB026

14. Remove the stator plate from the engine.

15. Remove the screws, lock washers, and washers securing the oil-injection pump to the crankcase; then remove the pump, retainer, shim, and gear. Account for two gaskets.

2

Fig. 2-73



AB018

16. Remove the spark plugs.

17. Remove the eight nuts, lock washers, and washers securing the cylinder heads to the cylinders. Note the position of the different-sized nuts. Remove the heads and account for two gaskets.

Fig. 2-74



B563

18. Using a rubber hammer, gently tap the cylinders and remove from the crankcase by lifting them straight up off their studs. Discard the two gaskets.

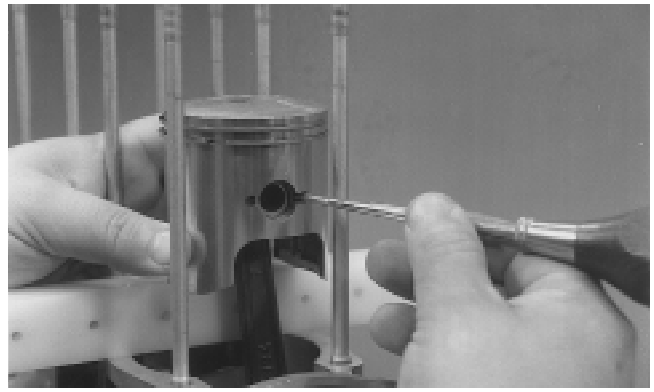
⚠ CAUTION
When removing a cylinder, make sure to support the pistons so they will not be damaged.

19. Using a felt-tipped marker, mark an M on the MAG-side head, cylinder, and piston and a P on the PTO-side head, cylinder, and piston.

■ **NOTE: For proper assembly, keep all MAG-side components and all PTO-side components separated. Assemble them on their proper sides.**

20. Remove the PTO-side piston-pin circlip from the PTO-side piston; remove the MAG-side piston-pin circlip from the MAG-side piston.

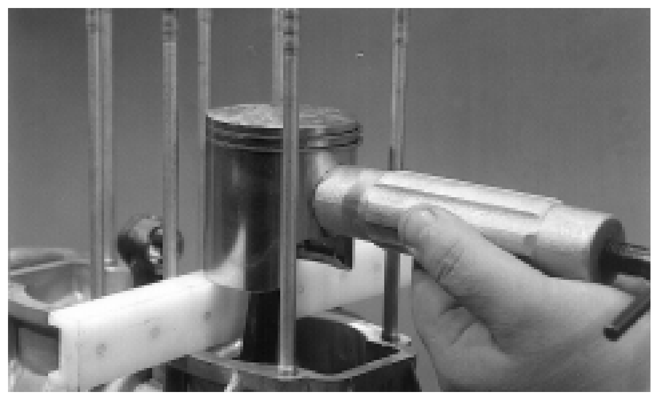
Fig. 2-75



A829

21. Using the Piston-Pin Puller (p/n 0644-328), remove the piston pins from both pistons.

Fig. 2-76



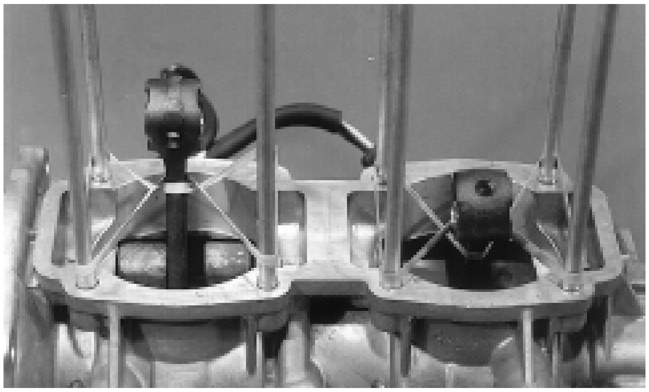
A830

⚠ CAUTION
DO NOT use any type of punch to drive the piston pin free of the piston; damage may result. Use a piston-pin puller only.

22. Lift the pistons clear of the connecting rods and remove the small end connecting-rod bearings; then remove the piston rings. Keep each piston with its rings, piston pin, and bearing together as a set.

■ **NOTE: Place rubber bands over the connecting rods and around the cylinder studs. This will keep the connecting rods from damaging the crankcase.**

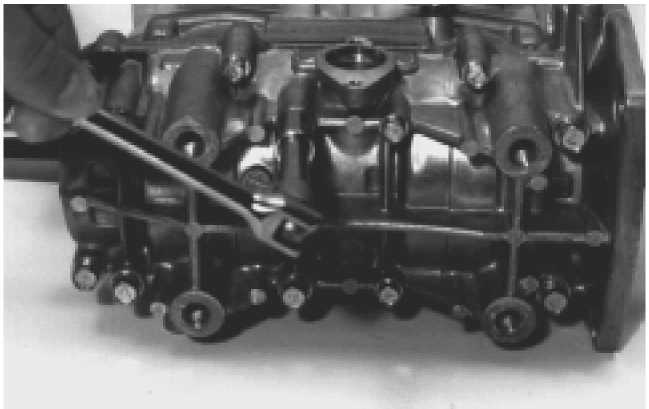
Fig. 2-77



B160

23. Remove the cap screws securing the crankcase halves. Note the position of the different-sized cap screws.

Fig. 2-78



A831

24. Separate the crankcase halves by installing two crankcase cap screws in diagonal corners leaving the heads approximately 6 mm (1/4 in.) out. Using a plastic hammer, tap on each cap screw head until the halves separate. Remove the cap screws.

⚠ CAUTION

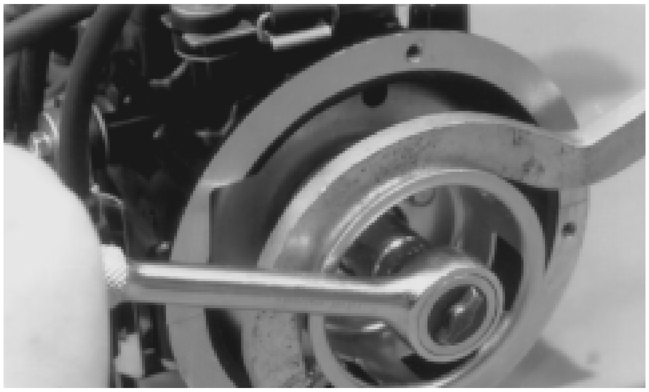
DO NOT drive any tool between the crankcase halves to separate the crankcase. Damage to the sealing surfaces will result.

25. Remove the rubber bands holding the connecting rods; then separate the crankcase halves. Account for the two dowel pins. Lift the crankshaft free from the crankcase half and slide the two crankshaft seals off the crankshaft. Account for the C-ring and five bearing dowel pins.

Disassembling Engine (440 LC/550 cc Models)

1. Using the spanner wrench to secure the flywheel, remove the flywheel nut, lock washer, and flat washer; then remove the three starter pulley cap screws and remove the pulley.

Fig. 2-79



AN015

2. Install the Crankshaft Protector Cap (p/n 0644-234) onto the end of the crankshaft.

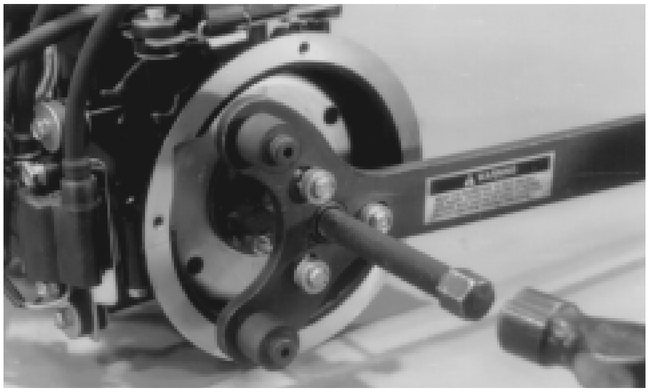
■ **NOTE: A suitable substitute protective cap can be made by welding a 3 mm (1/8 in.) plate on one side of a spare flywheel nut.**

3. Using the Flywheel Puller/Spanner Wrench (p/n 0144-310) or suitable substitute, remove the flywheel from the crankshaft by tightening the puller bolt, striking the head of the puller bolt with a hammer, and tightening again. Repeat this procedure until the flywheel is free. Account for the key.

⚠ CAUTION

To prevent damage to the crankshaft, the puller must bottom on the cap and not on the crankshaft. Also, do not thread puller bolts more than 12.7 mm (1/2 in.) into the flywheel. Damage to the coils may result.

Fig. 2-80

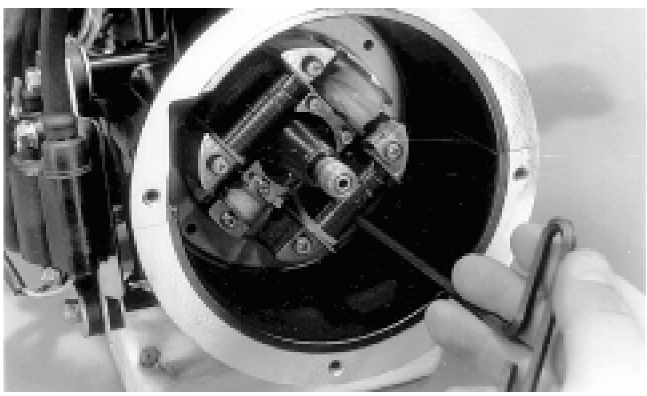


AN020

■ **NOTE: To ensure the cleanliness of the flywheel magnets, place the flywheel (with the magnets facing upward) on a clean bench.**

4. Scribe a line on the stator plate and magneto case to aid in assembly; then remove the two Allen-head cap screws, lock washers, and washers securing the stator plate. Remove the stator plate from the engine.

Fig. 2-81

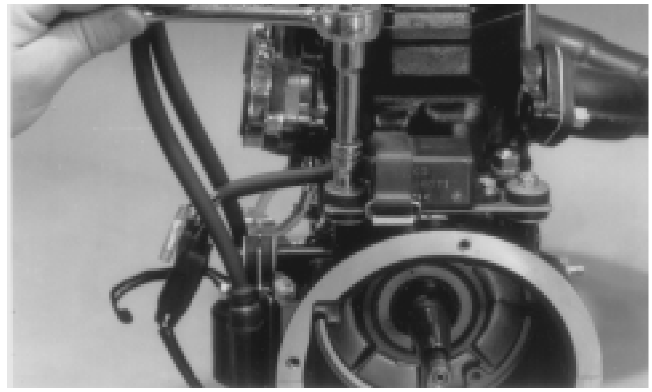


AN022

■ **NOTE: The stator plate screws had Loctite applied to the threads during assembly. Using an impact driver, apply a sharp blow to the head of each screw to break the Loctite loose before removal.**

5. On the 440 cc, remove the cap screws and washers securing the CDI unit and the external coil; then remove from the engine.

Fig. 2-82



AN024

6. Remove the four nuts and lock washers securing the exhaust manifold; then remove the manifold and account for the two exhaust gaskets.

7. Remove the three cap screws securing the thermostat cap; then remove the cap, gasket, and thermostat.

■ **NOTE: The thermostat is of the lock-open type. If the thermostat is ever allowed to fully open, it will remain open and replacement will be necessary.**

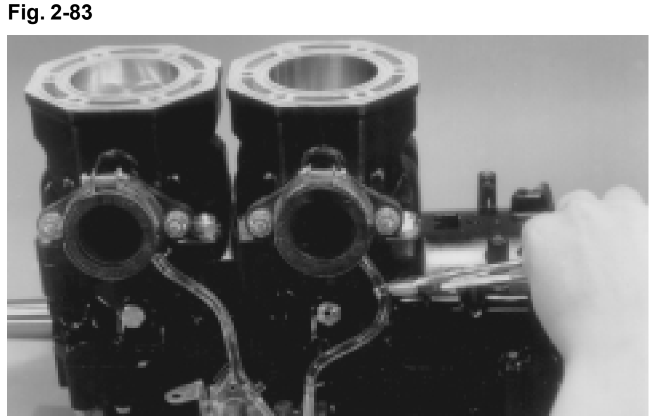
8. Remove the four cap screws securing the thermostat manifold to the cylinder heads. Remove the manifold and discard the gaskets.

9. Remove the spark plugs.

10. Remove the six cap screws and O-rings securing each head; then separate from the cylinder. Account for two large O-rings beneath each head.

11. Remove the oil-injection hose from each cylinder and the crankcase nozzle.

Fig. 2-83



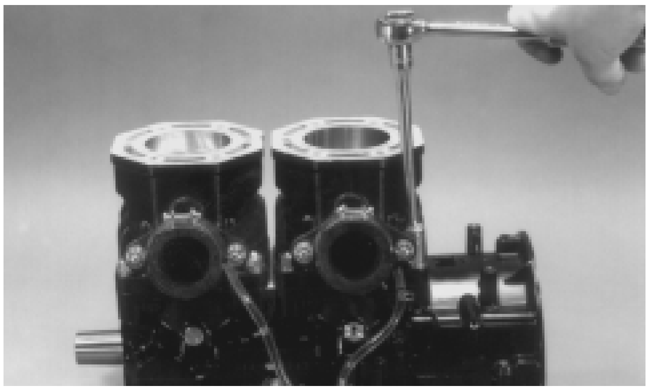
AN032

12. Remove the eight nuts, lock washers, and washers securing the cylinders to the crankcase; then using a rubber hammer, gently tap the cylinders and remove from the crankcase by lifting them straight up off their studs. Account for two gaskets.

> ⚠ **CAUTION**
>
> **When removing a cylinder, be sure to support the piston to prevent damage to the crankcase and piston.**

■ **NOTE: The metal cylinder base gaskets may be reused. When reusing gaskets, they must be cleaned and sprayed with Copper Coat Gasket Sealant (p/n 0636-092) on each side.**

Fig. 2-84



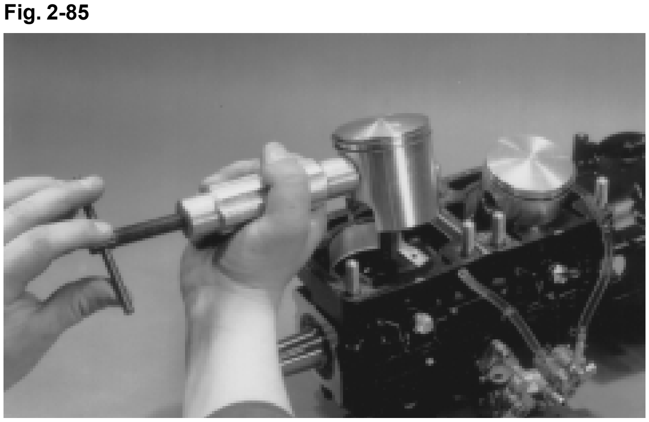
AN033

13. Remove the PTO-side piston-pin circlip from the PTO-side piston; then remove the MAG-side piston-pin circlip from the MAG-side piston.

14. Using the Piston Pin Puller (p/n 0644-328), remove the piston pins from both pistons.

■ **NOTE: For proper assembly, keep all MAG-side components and all PTO-side components separated. Assemble them on their proper sides.**

Fig. 2-85



AN036

> ⚠ **CAUTION**
>
> **DO NOT use any type of punch to drive the piston pin free of the piston; damage may result. Use a piston-pin puller only.**

15. Lift the pistons clear of the connecting rods and remove the small-end connecting-rod bearings; then remove the piston rings. Keep each piston with its rings; keep each piston pin and bearing together as a set.

■ **NOTE: Place rubber bands over the connecting rods and around the cylinder studs. This will prevent the connecting rods from damaging the crankcase.**

16. Remove the two screws, lock washers, and washers securing the oil-injection pump to the crankcase. Remove the pump, retainer, and O-ring.

17. Remove the water pump cover. Account for the O-ring gasket.

18. Remove the cap screw securing the water pump impeller; then slide the impeller free of the shaft.

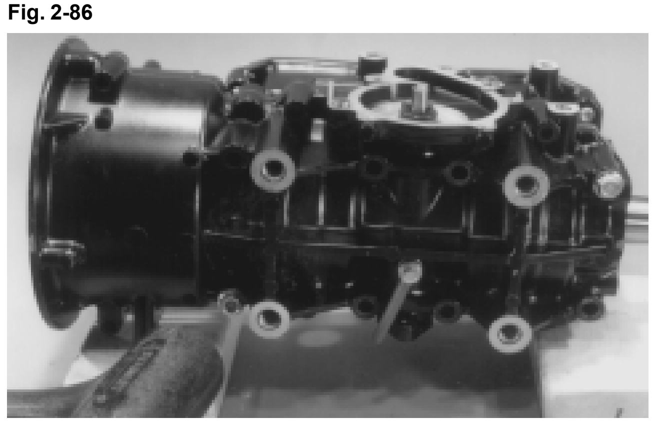
19. Using an impact driver, remove the screws securing the PTO-end plate to the crankcase; then remove the plate.

20. Position the crankcase (with its bottom side up) on two blocks of wood. Remove the fourteen cap screws securing the crankcase halves. Note the position of the different-sized cap screws.

21. Separate the crankcase halves by installing two crankcase cap screws in opposite corners leaving the heads approximately 6 mm (1/4 in.) out. Using a plastic-tipped hammer, tap on each cap screw head until the case halves separate. Remove the cap screws.

> ⚠ **CAUTION**
>
> **DO NOT drive any tool between halves to separate the crankcase. Damage to the sealing surfaces will result.**

Fig. 2-86



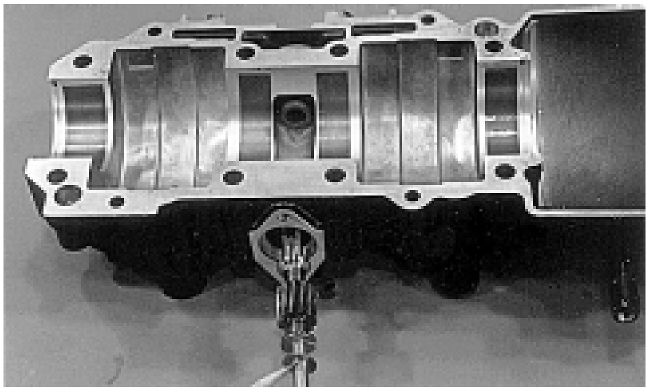
AN045

22. Lift the bottom half of the crankcase off the top half.

23. Lift the crankshaft free from the top half of the crankcase and slide the crankshaft oil seals off the crankshaft. Account for the C-ring. Remove the four bearing dowel pins.

24. Remove the oil-injection pump driveshaft from the lower crankcase half. Account for the thrust washer on the outer end of the shaft.

Fig. 2-87

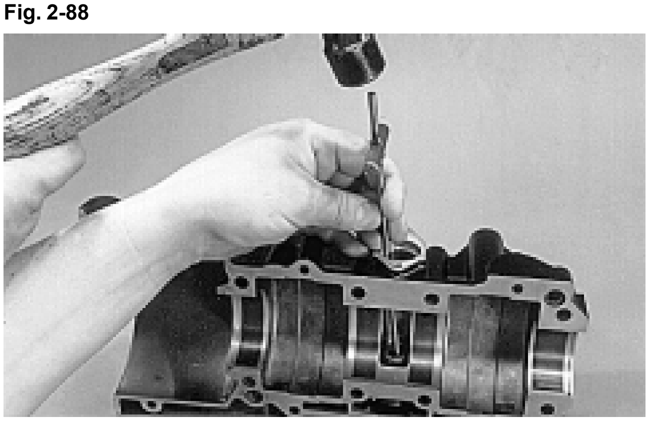


AN047

■ **NOTE: Do not replace the inner seals unless the water pump shows signs of leaking coolant out of the small bleed hole in the bottom half of the crankcase. If a water pump seal is to be replaced, use the Water Pump Bearing and Seal Kit (p/n 0644-084) and see Cleaning and Inspecting Engine in this section.**

25. Place the crankcase on the bench with the water pump side down. Using the long seal driver, drive the water pump seal from the crankcase.

Fig. 2-88

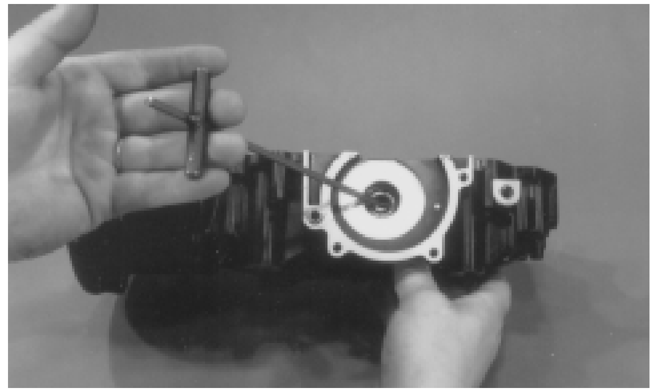


AN049

26. Remove the snap ring securing the inner seal in the crankcase.

27. Using the hooked end of the tool, pull the inner seal free of the crankcase.

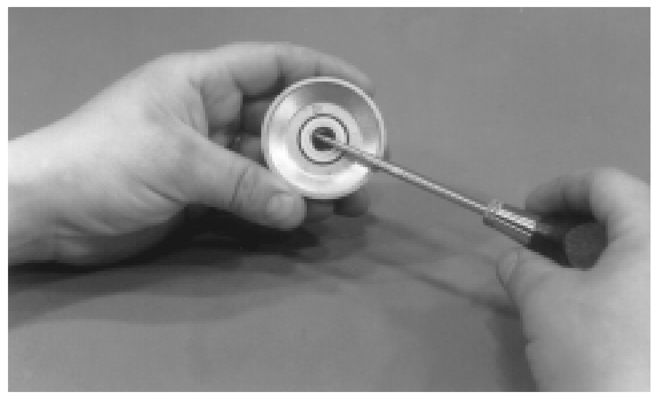
Fig. 2-89



AN050

28. Using a sharp, pointed tool, pry the seal ring from the backside of the water pump impeller.

Fig. 2-90



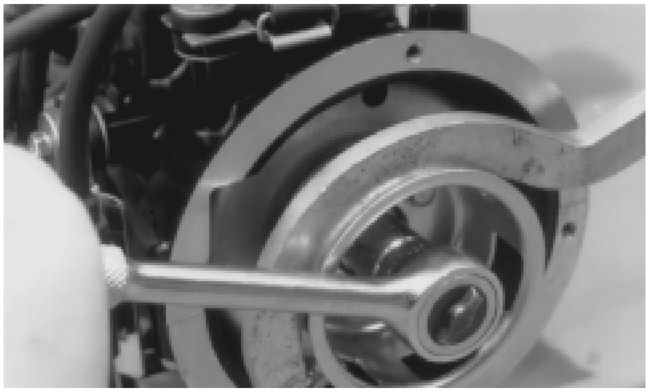
AN051

Disassembling Engine (500/580/600 cc Twin Models)

■ **NOTE: On the 580 cc, remove the ignition timing sensor from the magneto housing.**

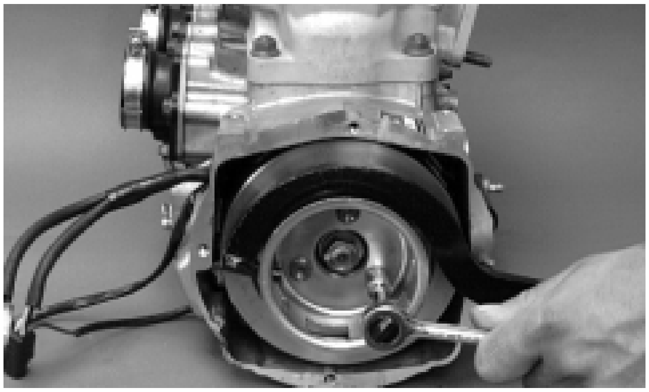
1. Using the spanner wrench to secure the flywheel, remove the flywheel nut, lock washer, and flat washer; then remove the three starter pulley cap screws and remove the pulley.

Fig. 2-91



AN015

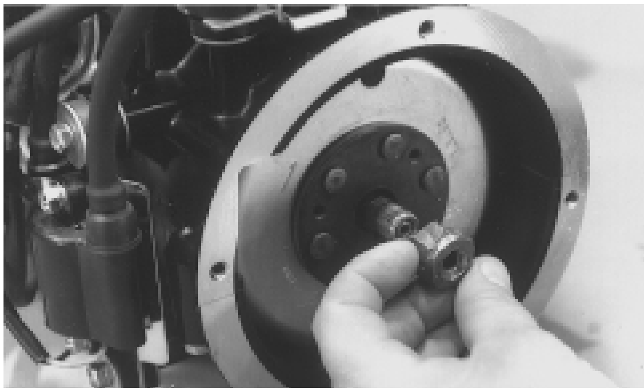
Fig. 2-92



AN407D

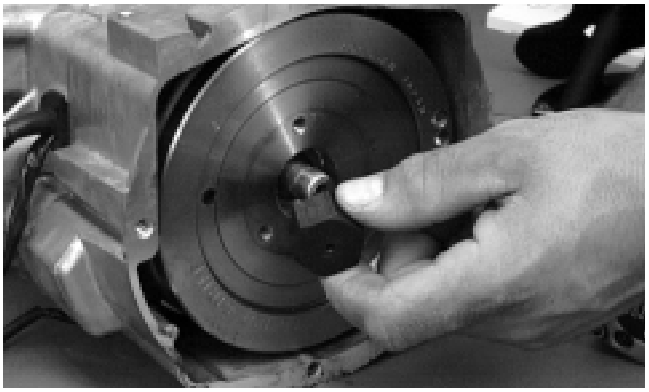
2. Install the Crankshaft Protector Cap (p/n 0644-234) onto the end of the crankshaft.

Fig. 2-93



AN018

Fig. 2-94



AN408D

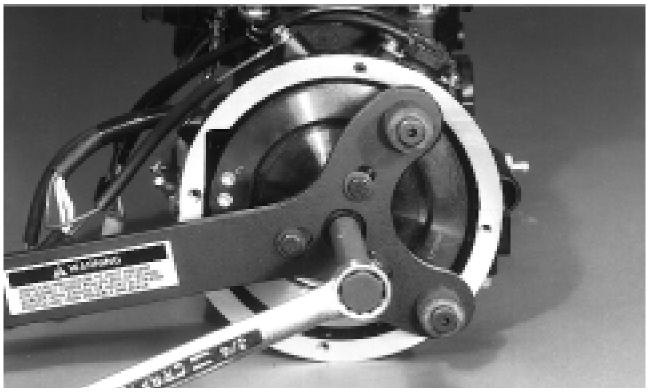
■ **NOTE: A suitable substitute protective cap can be made by welding a 3 mm (1/8 in.) plate on one side of a spare flywheel nut.**

3. Using the Flywheel Puller/Spanner Wrench (p/n 0144-310) or suitable substitute, remove the flywheel from the crankshaft by tightening the puller bolt, striking the head of the puller bolt with a hammer, and tightening again. Repeat this procedure until the flywheel is free. Account for the key.

⚠ CAUTION

To prevent damage to the crankshaft, the puller must bottom on the cap and not on the crankshaft. Also, do not thread puller bolts more than 12.7 mm (1/2 in.) into the flywheel. Damage to the coils may result.

Fig. 2-95



AR105

Fig. 2-96

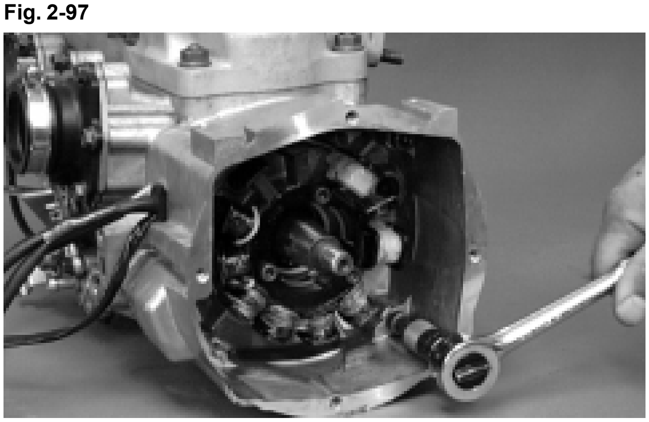


AN410D

■ **NOTE: To ensure the cleanliness of the flywheel magnets, place the flywheel (with the magnets facing upward) on a clean bench.**

4. On the 500 cc/600 cc, remove the four Allen-head cap screws securing the magneto case to the crankcase.

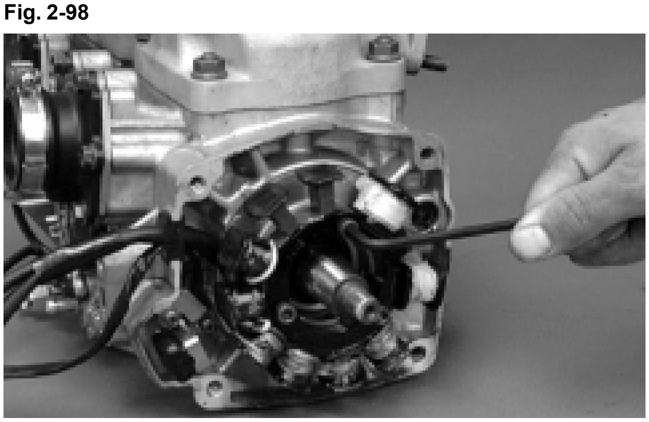
Fig. 2-97



AN412D

5. On the 500 cc/600 cc, remove the Allen-head cap screws securing the stator to the stator plate.

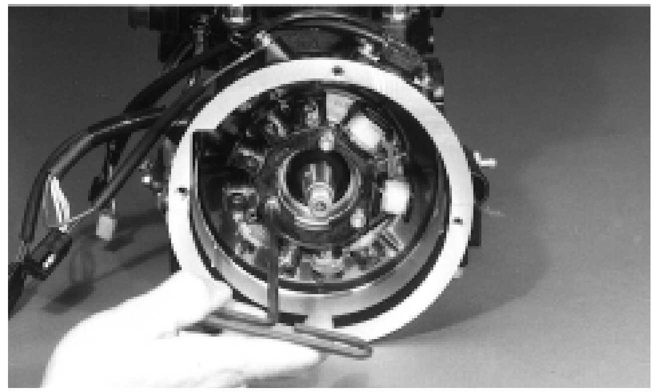
Fig. 2-98



AN413D

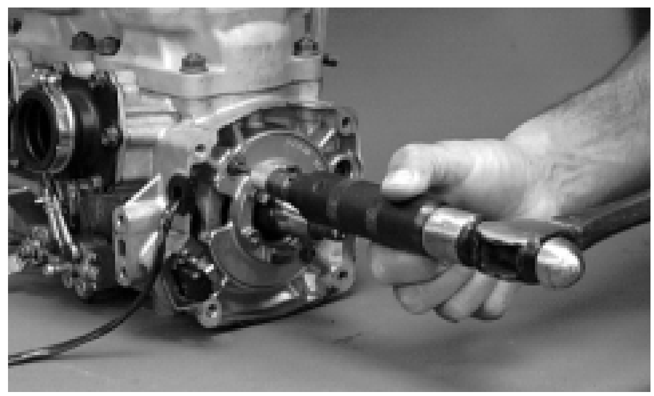
6. Remove the Allen-head cap screws securing the stator plate. Remove the stator plate from the engine.

Fig. 2-99



AR106

Fig. 2-100

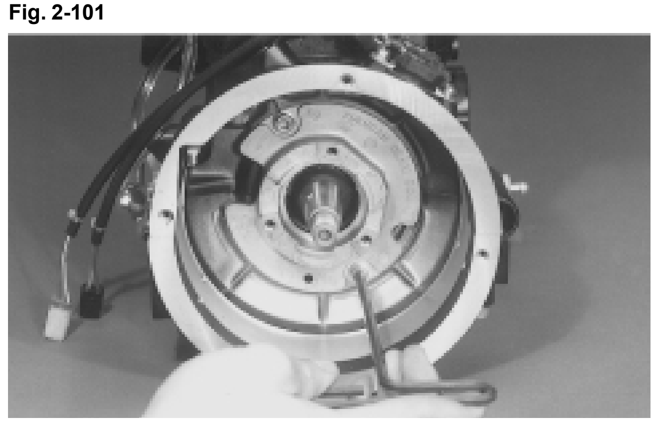


AN414D

■ **NOTE: The stator plate screws had Loctite applied to the threads during assembly. Using an impact driver, apply a sharp blow to the head of each screw to break the Loctite loose before removal.**

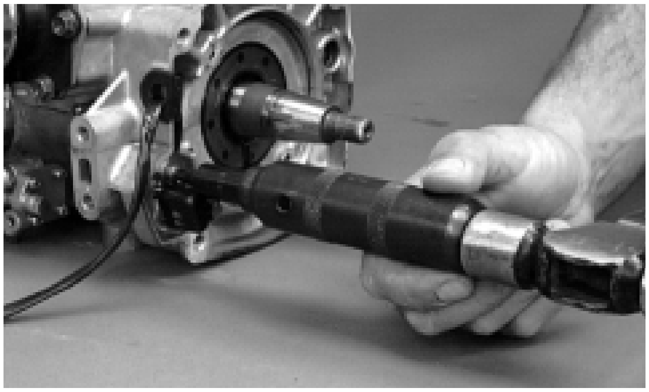
7. On the 580 cc, remove the Allen-head screws securing the stator base. On the 500 cc/600 cc, remove the ignition timing sensor.

Fig. 2-101



AR107

Fig. 2-102



AN415D

8. Remove the three cap screws securing the thermostat cap; then remove the cap, gasket, and thermostat.

9. Remove the spark plugs.

■ **NOTE: On the 580 cc, remove the cap screws securing the thermostat manifold to the cylinder heads. Remove the manifold and discard the gaskets.**

10. Remove the cap screws with O-rings securing the cylinder head(s); then separate from the cylinders. Account for the O-rings.

11. Remove the oil-injection hose from each cylinder and the crankcase nozzle.

Fig. 2-103



AN420D

12. Remove the eight nuts (with lock washers and washers) securing the cylinders to the crankcase; then using a rubber hammer, gently tap the cylinders and remove from the crankcase by lifting them straight up off their studs. Account for gasket(s) and any alignment bushings.

⚠ CAUTION

When removing a cylinder, be sure to support the piston to prevent damage to the crankcase and piston.

13. Remove the PTO-side piston-pin circlip from the PTO-side piston; then remove the MAG-side piston-pin circlip from the MAG-side piston.

Fig. 2-104



AN315D

14. Using the Piston Pin Puller (p/n 0644-328), remove the piston pins from both pistons.

■ **NOTE: For proper assembly, keep all MAG-side components and all PTO-side components separated. Assemble them on their proper sides.**

Fig. 2-105



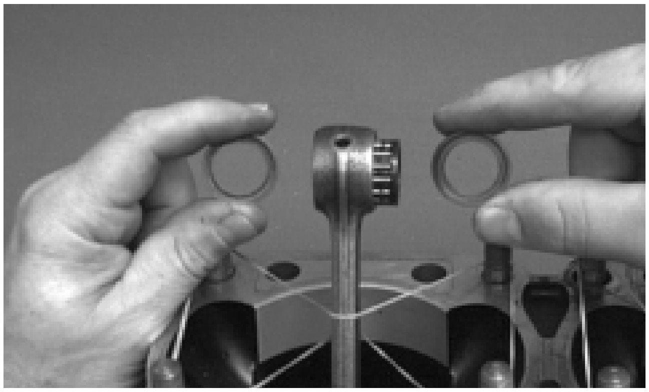
AN316D

⚠ CAUTION

DO NOT use any type of punch to drive the piston pin free of the piston; damage may result. Use a piston-pin puller only.

15. Lift the pistons clear of the connecting rods and remove the small-end connecting-rod bearings (account for two washers); then remove the piston rings. Keep each piston with its rings; keep each piston pin and bearing together as a set.

Fig. 2-106

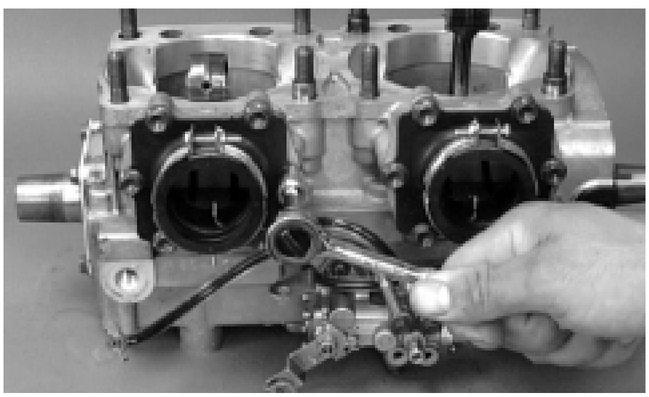


AN317D

■ **NOTE: Place rubber bands over the connecting rods and around the cylinder studs. This will prevent the connecting rods from damaging the crankcase.**

16. On the 500 cc/600 cc, remove the intake manifolds and reed block assemblies.

Fig. 2-107



AN433D

17. Remove either lower union cap screw securing the lower check valve assembly; then remove the two screws, lock washers, and washers securing the oil-injection pump to the crankcase. Remove the pump, retainer, and O-ring.

18. Remove the five screws securing the water pump cover to the crankcase and remove the cover. Account for the O-ring gasket.

19. Remove the cap screw securing the water pump impeller; then slide the impeller free of the shaft.

20. Remove the cap screws securing the PTO-end plate to the crankcase; then remove the plate.

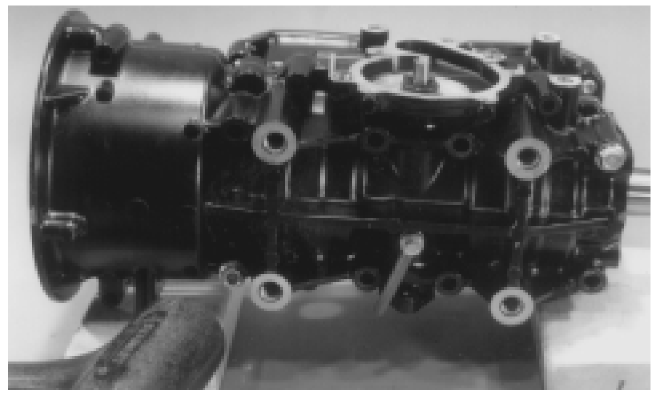
21. Position the crankcase, with its bottom side up, on two blocks of wood. Remove the cap screws securing the crankcase halves.

22. Separate the crankcase halves by installing two crankcase cap screws in opposite corners leaving the heads approximately 6 mm (1/4 in.) out. Using a plastic-tipped hammer, tap on each cap screw head until the case halves separate. Remove the cap screws.

⚠ CAUTION

DO NOT drive any tool between halves to separate the crankcase. Damage to the sealing surfaces will result.

Fig. 2-108



AN045

23. Lift the bottom half of the crankcase off the top half.

⚠ CAUTION

Care must be taken to not allow the connecting rods to drop onto the sealing surface of the bottom case half.

24. Lift the crankshaft free from the top half of the crankcase and slide the crankshaft oil seals off the crankshaft. Account for the C-ring. Remove the bearing dowel pins.

25. Remove the oil-injection pump/water pump driveshaft from the lower crankcase half. Account for the thrust washer on the outer end of the shaft.

Fig. 2-109

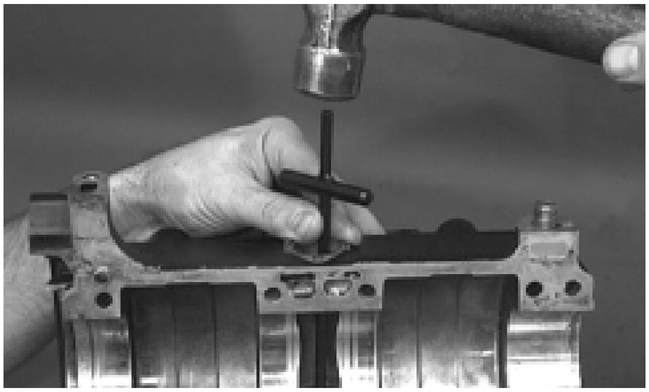


AN324D

■ **NOTE: Do not replace the inner seals unless the water pump shows signs of leaking coolant out of the small bleed hole in the bottom half of the crankcase. If a water pump seal is to be replaced, use the Water Pump Bearing and Seal Kit (p/n 0644-084).**

26. Place the crankcase on the bench with the water pump side down. Using the long seal driver, drive the mechanical water pump seal from the crankcase.

Fig. 2-110

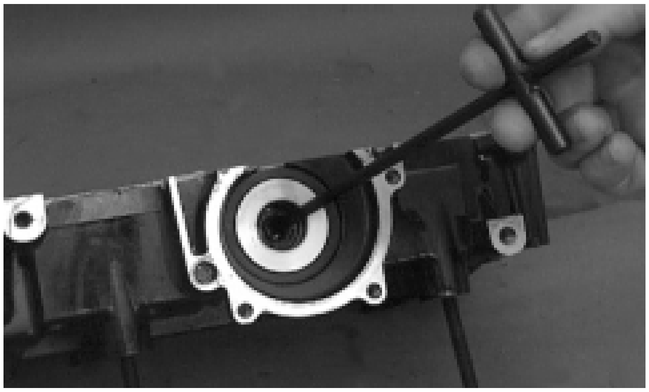


AN325D

27. Using a pair of snap ring pliers, remove the snap ring securing the inner seal in the crankcase.

28. Using the hooked end of the tool, pull the inner seal free of the crankcase.

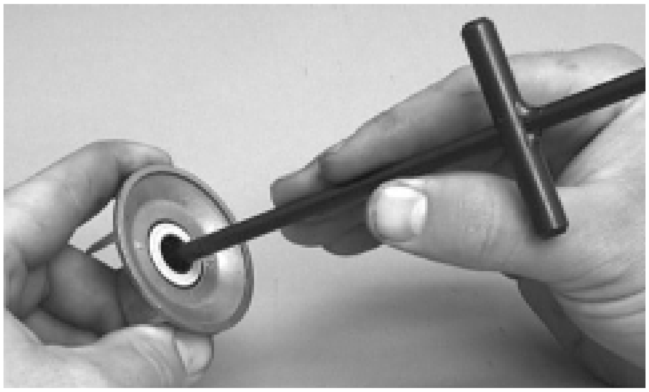
Fig. 2-111



AN326D

29. Using the hooked end of the tool, pry the seal ring from the backside of the water pump impeller.

Fig. 2-112

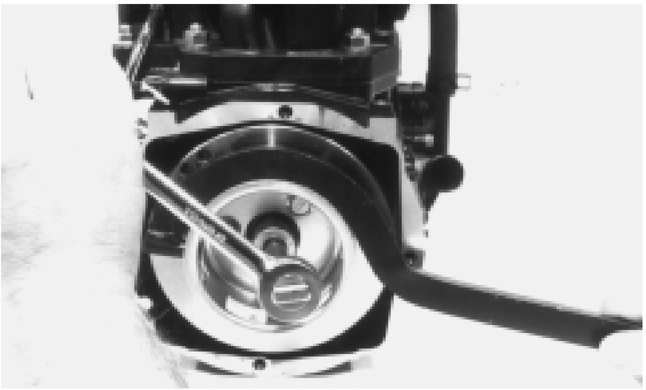


AN327D

Disassembling Engine (700 cc Models)

1. Using a spanner wrench to secure the flywheel, remove the flywheel nut, lock washer, and flat washer.

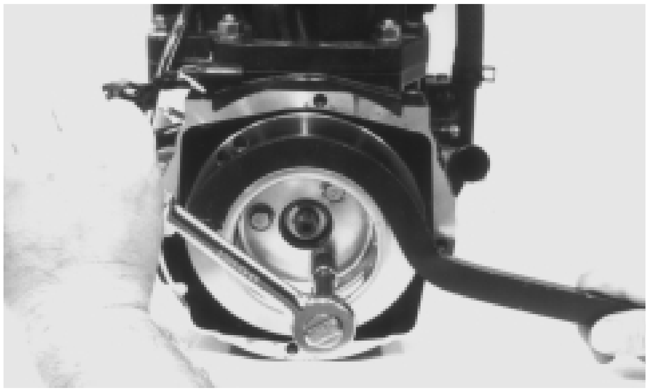
Fig. 2-113



AJ012

2. Using a spanner wrench to secure the crankshaft, remove the three cap screws from the starter pulley. Remove the starter pulley.

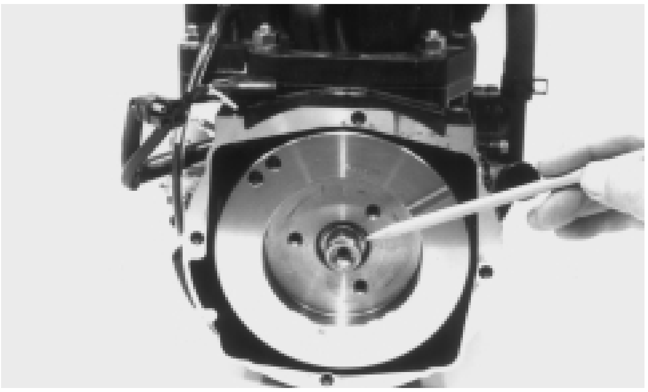
Fig. 2-114



AJ013

3. Install Protective Cap (p/n 0644-234) onto the end of the crankshaft.

Fig. 2-115



AJ014

■ **NOTE: A protective cap can be made by welding a 3 mm (1/8 in.) plate on one end of a spare flywheel nut.**

> ⚠ **CAUTION**
>
> **To prevent damage to the crankshaft, thread a protective cap onto the crankshaft. The puller must bottom on the cap and not on the crankshaft. Also, do not thread puller bolts more then 12.7 mm (1/2 in.) into the flywheel. Damage to the coils may result.**

4. Using Flywheel Puller (p/n 0144-310), remove the flywheel from the crankshaft by tightening the puller bolt, striking the head of the puller bolt with a brass hammer, and tightening again. Repeat procedure until the flywheel is free. Account for the key in the crankshaft keyway.

> ⚠ **CAUTION**
>
> **When installing Flywheel Puller (p/n 0144-310), it must be installed with its welded side facing outward or the puller will be damaged.**

Fig. 2-116



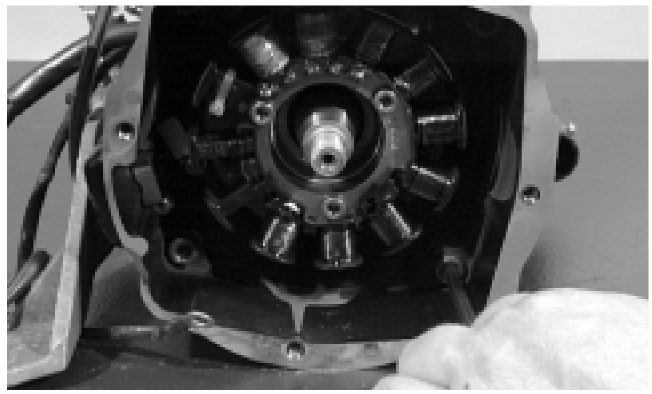
AJ015

> ⚠ **CAUTION**
>
> **Before applying excessive pressure to the center flywheel puller bolt, check to make sure puller bolt is pulling straight. If it is pulling to one side, the crankshaft will be damaged. Square the puller using the three bolts that attach the puller to the flywheel.**

■ **NOTE: To ensure the cleanliness of the flywheel magnets, place the flywheel (with the magnets facing upward) on a clean bench.**

5. Remove the cap screws securing the magneto housing to the crankcase; then remove the housing.

Fig. 2-117



AJ659

6. Remove the cap screws, lock washers, and washers securing the stator.

Fig. 2-118

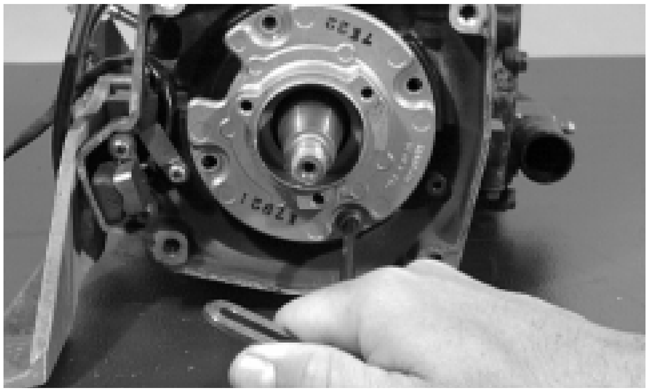


AJ660

7. Remove the rubber grommet from the stator wiring harness. Slide stator free of the crankshaft and remove.

8. Remove the cap screws securing the stator backing plate. Remove the plate from the crankcase.

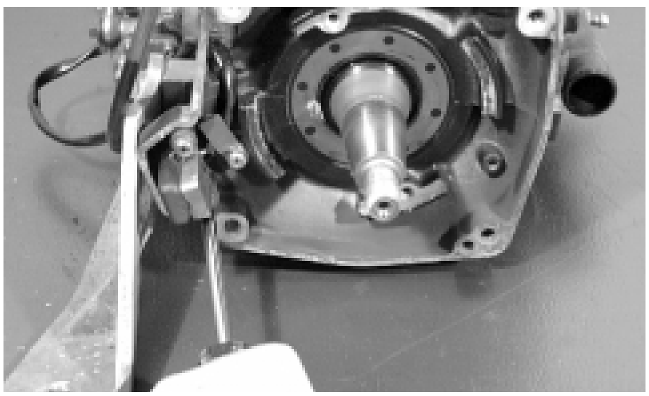
Fig. 2-119



AJ661

9. Remove the cap screws securing the ignition timing sensor; then remove the sensor from the engine.

Fig. 2-120



AJ662

10. Remove the three cap screws securing the thermostat cap; then remove cap, rubber gasket, and thermostat.

11. Remove the cap screws securing the thermostat manifold to the cylinder heads. Remove the manifold and discard gaskets.

Fig. 2-121



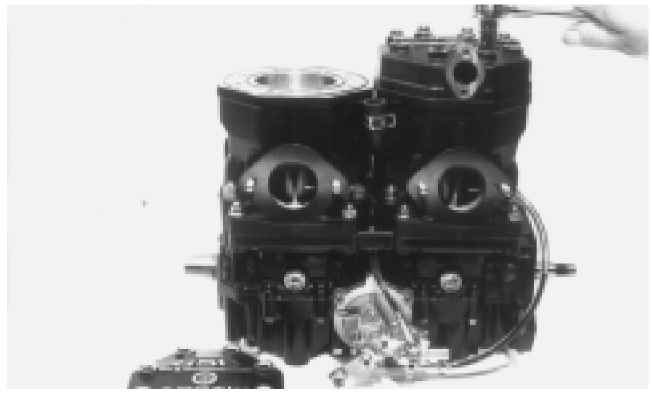
AJ022

12. Remove the spark plugs.

13. Remove the eight cap screws and O-rings securing each head; then separate each head from each cylinder. Account for two O-rings beneath each head.

■ **NOTE: Mark each cylinder head, cylinder, and piston and keep together as an assembly. Mark the MAG cylinder components #1 and the PTO cylinder components #2.**

Fig. 2-122

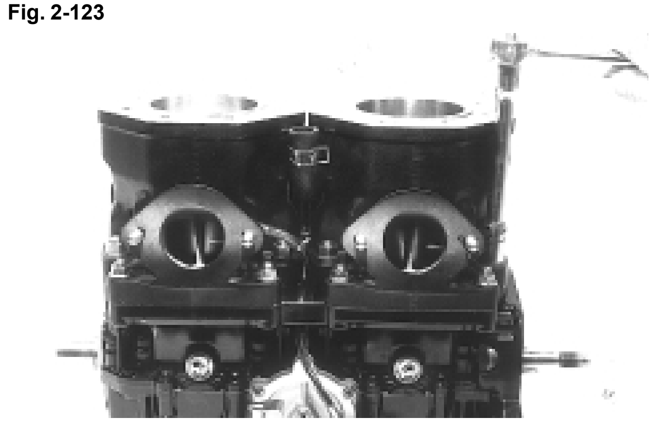


AJ023

14. Remove the oil-injection hose from each cylinder nozzle.

15. Remove the eight cylinder base nuts and four flange nuts securing the cylinders to the crankcase. Account for eight flat washers and lock washers. Using a rubber hammer, gently tap on the side of each cylinder to free it from the crankcase.

Fig. 2-123



AJ027

16. Slowly lift each cylinder straight up and free of the studs. Grasp the connecting rod and piston as the cylinder clears the piston to prevent the rod from dropping against the crankcase. Remove and save the cylinder base gaskets.

Fig. 2-124

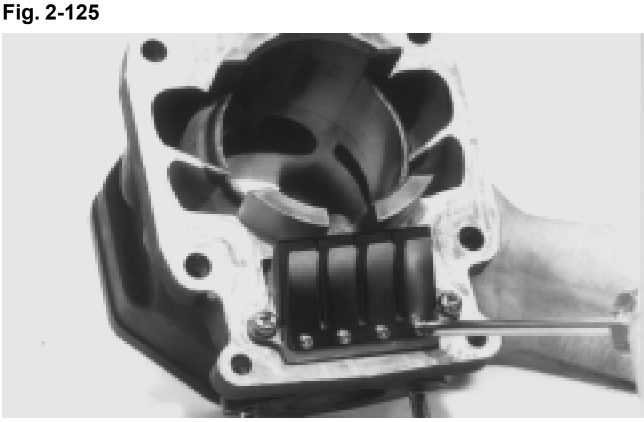


AJ028

> ⚠ **CAUTION**
>
> **As cylinders are removed, lay them on their side on the workbench. Never set cylinders upright on any hard surface. The reed stoppers will be damaged.**

17. Remove the four screws securing each reed stopper to each reed seat. Remove stopper and reed valve assembly.

Fig. 2-125



AJ058

■ **NOTE: The reed seat can remain on the cylinders unless it requires service; in which case, remove the two screws securing the reed seat to the cylinder; then remove the reed seat and discard the gasket.**

18. Remove the PTO-side piston-pin circlip from the PTO-side piston; remove the MAG-side piston-pin circlip from the MAG-side piston.

Fig. 2-126



AJ029

19. Using the Piston Pin Puller (p/n 0644-328), remove the piston pins from both pistons.

Fig. 2-127



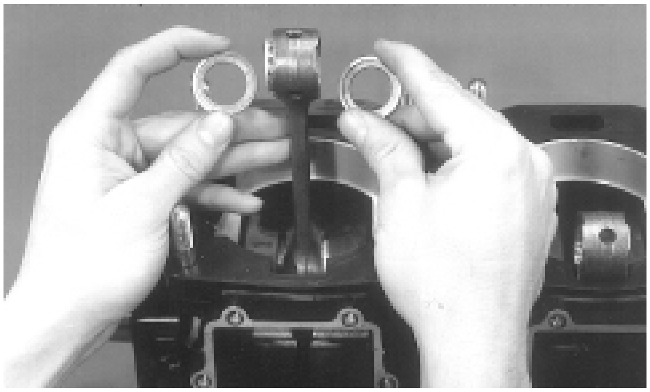
AJ030

■ **NOTE: For proper assembly, keep all MAG-side components and all PTO-side components separated. Assemble them on their proper sides.**

> ⚠ **CAUTION**
>
> **DO NOT use any type of punch to drive the pin free of the piston; damage may result. Use a piston-pin puller only.**

20. Lift the pistons clear of the connecting rods and account for two washers. Remove the small-end connecting-rod bearings; then remove the piston rings. Keep each piston with its rings; keep each piston, pin, and bearing together as a set.

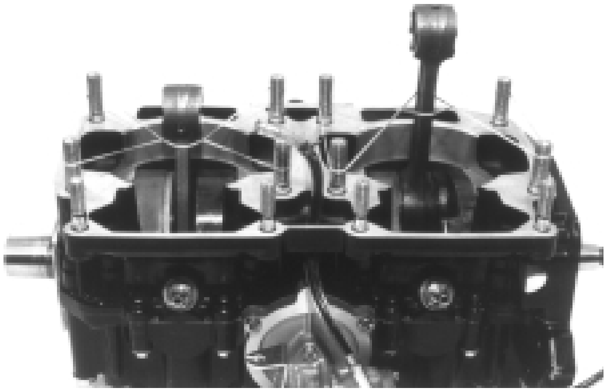
Fig. 2-128



AQ059

■ **NOTE: Place rubber bands over the connecting rods and around the cylinder studs. This will keep the connecting rods from damaging the crankcase.**

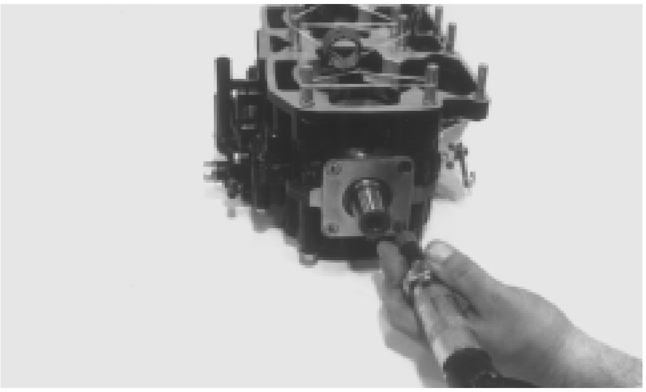
Fig. 2-129



AJ031

21. Using an impact driver, remove the four screws securing the PTO-end plate to the crankcase; then remove the plate.

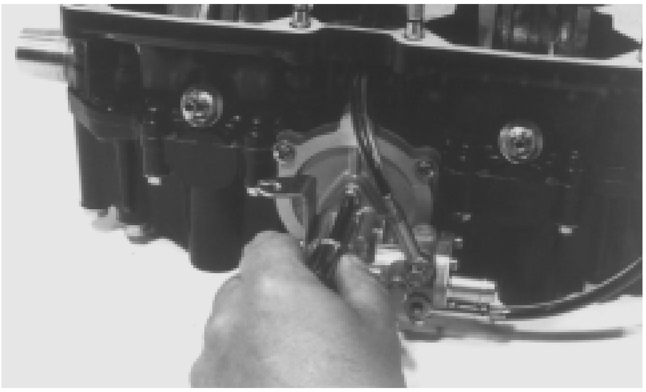
Fig. 2-130



AJ032

22. Remove the two screws and lock washers securing the oil-injection pump to the crankcase.

Fig. 2-131



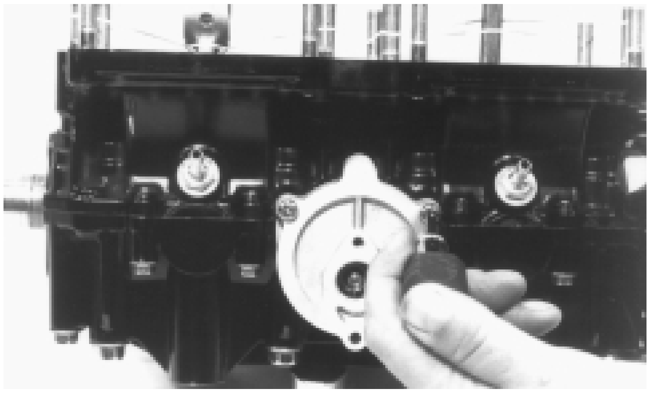
AJ035

⚠ CAUTION

Note that the shorter of the two screws securing the oil pump to the crankcase came from the top mounting hole of the oil-injection pump. It must be installed in the same location.

23. Remove the two screws securing the oil-injection pump retainer to the crankcase. Gently tap on the retainer with a plastic hammer to free it from the crankcase. Pull the retainer straight back and free of the crankcase. Account for the O-ring found around the inner flange of the retainer sealing surface.

Fig. 2-132



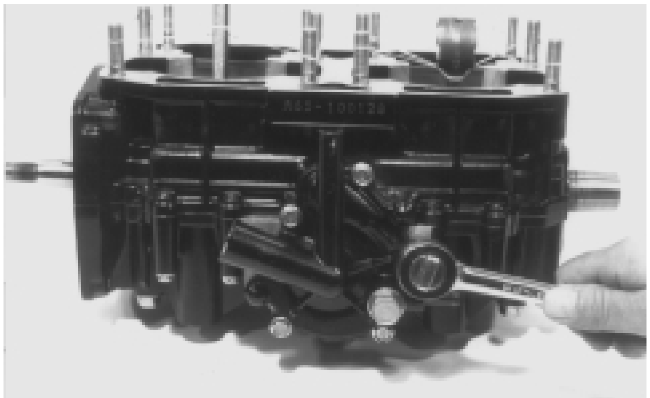
AJ036

■ **NOTE: Account for the shim washer(s) found on the upper pinion driven shaft. If no shim(s) are found on the shaft, check the retainer just removed as they will sometimes stick to the bearing race. Remove shim(s) and place in a safe place where they won't be lost.**

24. Remove the five cap screws securing the water pump cover to the crankcase. Remove the cover and O-ring seal.

2

Fig. 2-133

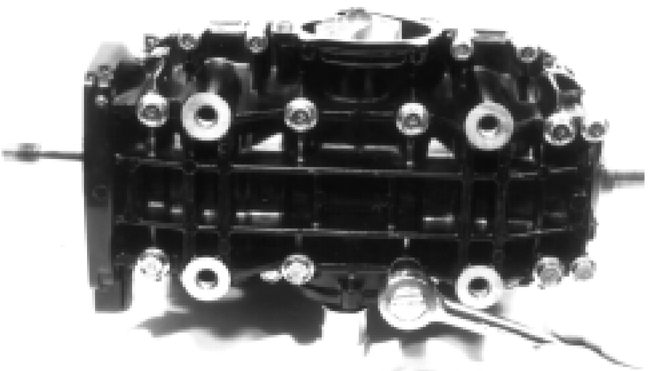


AJ033

■ **NOTE: Do not remove the water pump impeller or the impeller shaft unless necessary. Only remove impeller and shaft if there are signs of coolant leakage from the small hole located in the bottom of the crankcase directly behind the water pump housing.**

25. Lay the engine on its side and remove the 18 cap screws securing the crankcase halves. Note the position of the different-sized cap screws.

Fig. 2-134



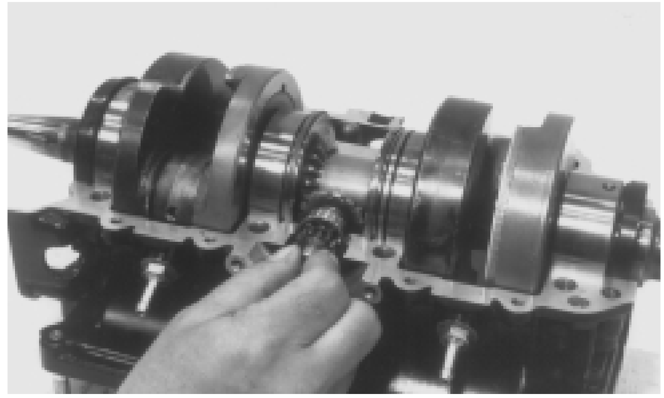
AJ038

26. Separate the crankcase halves by installing two crankcase cap screws in opposite corners leaving the heads approximately 6 mm (1/4 in.) out. Using a plastic tipped hammer, tap on each cap screw head until the case halves separate; then remove the two cap screws. Remove the rubber bands and lift the top half of the crankcase off the bottom half. Grasp the connecting rods as the top half of the crankcase is removed. Do not allow them to drop onto the sealing surface of the bottom case half.

> **⚠ CAUTION**
>
> **DO NOT drive any tool between halves to separate the crankcase. Damage to the sealing surfaces will result.**

27. Remove the pinion gear from the crankcase; account for the C-ring.

Fig. 2-135



AJ041

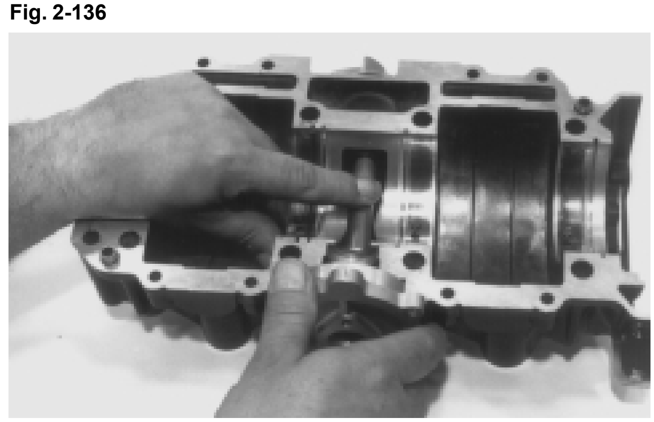
28. Lift the crankshaft free from the crankcase half and slide the crankshaft oil seals off the ends of the crankshaft. Account for the C-ring. Slide the bearing off the PTO-end of crankshaft. Remove the bearing dowel pins from the crankcase.

> **⚠ CAUTION**
>
> **DO NOT remove the water pump impeller or shaft unless necessary. The shaft and impeller should only be removed from the lower crankcase half when there is a coolant leakage problem or a rough inner bearing. To inspect for either condition, follow steps A through D.**

A. Remove the O-ring from the oil-injection pump retainer. Slide the retainer into position on the shaft in the lower half of the crankcase.

B. While holding the retainer tight against the crankcase, rotate the shaft. Bearing rotation must feel smooth.

Fig. 2-136

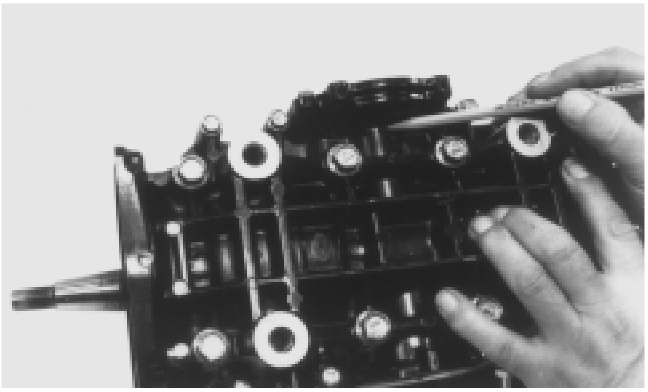


AJ044

C. If any roughness is felt, remove the retainer and inspect its bearing by turning it several revolutions. If it is smooth, the shaft must then be removed and the inner bearing inspected. Turn inner bearing by hand. If any roughness is felt, replace the inner bearing.

D. Check the bottom of the water pump housing for any signs of coolant leakage. The small hole, located on the bottom of the crankcase directly behind the water pump housing, will show coolant stains if the seal has any leakage problems. If stains or any signs of leakage are present, remove impeller and shaft and replace seals.

Fig. 2-137

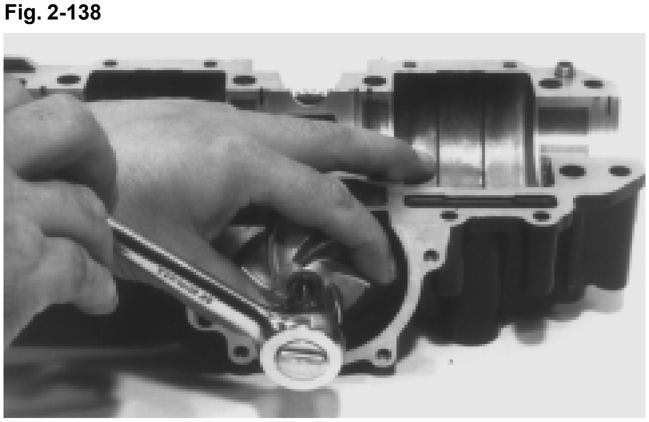


AJ045

■ **NOTE: For instructions on bearing and seal replacement, see the appropriate Assembling Engine sub-section of this manual. Complete steps 29-35 only if there is a bad seal or shaft bearing.**

29. Remove the cap screw securing the impeller to the shaft.

Fig. 2-138



AJ046

30. Slowly pull the shaft from the lower half of the crankcase.

■ **NOTE: Use the Water Pump Bearing and Seal Kit (p/n 0644-084) to remove and replace the water pump bearing and seals.**

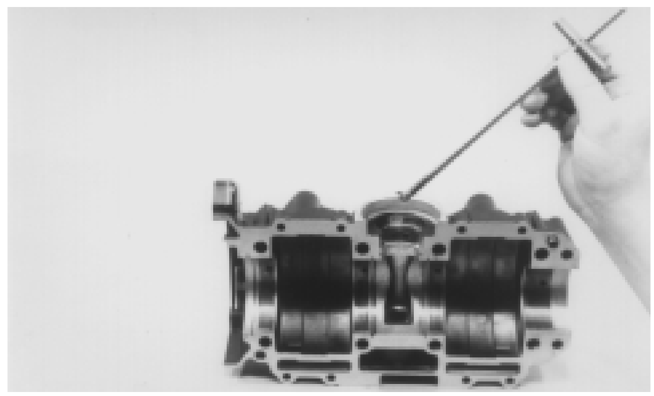
Fig. 2-139



AJ142

31. Using the special tool, remove the water pump seal by inserting the tool rod down through the inner bearing and seal. Position the end of the tool up against the back side of the metal case of the outer water pump seal.

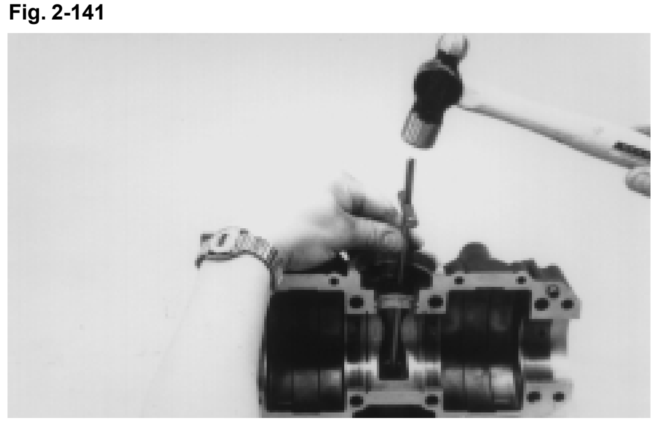
Fig. 2-140



AJ143

32. Using a hammer, gently tap on the rod while moving the end of the tool from side to side of the seal casing. Repeat until the seal is free of the crankcase.

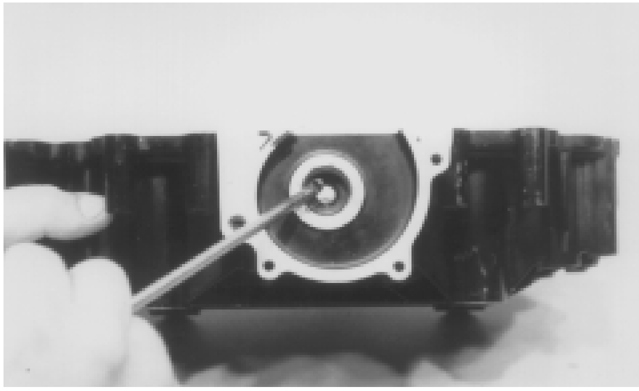
Fig. 2-141



AJ144

33. Using the hooked end of the tool, pull the inner seal free of the crankcase.

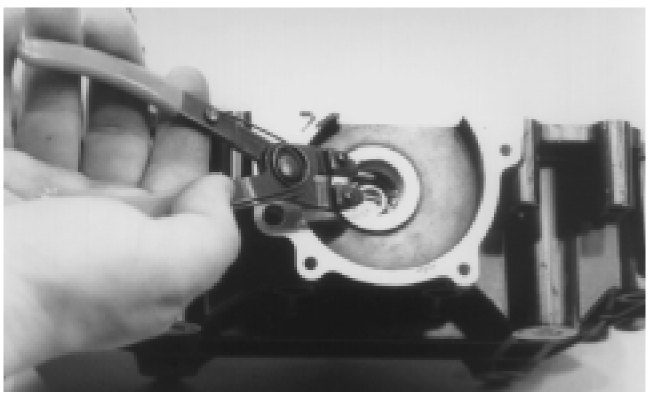
Fig. 2-142



AJ145

34. Using a pair of snap ring pliers, remove the snap ring located in front of the water pump bearing.

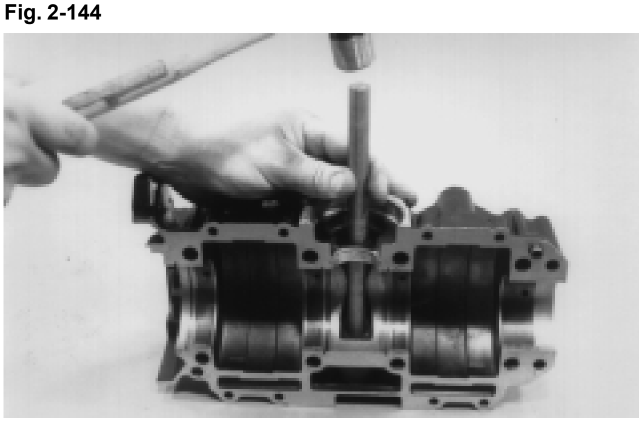
Fig. 2-143



AJ146

35. Using the bearing driver from the special tool kit, drive the water pump bearing from the crankcase.

Fig. 2-144



AJ147

Disassembling Engine (600 cc Triple Models)

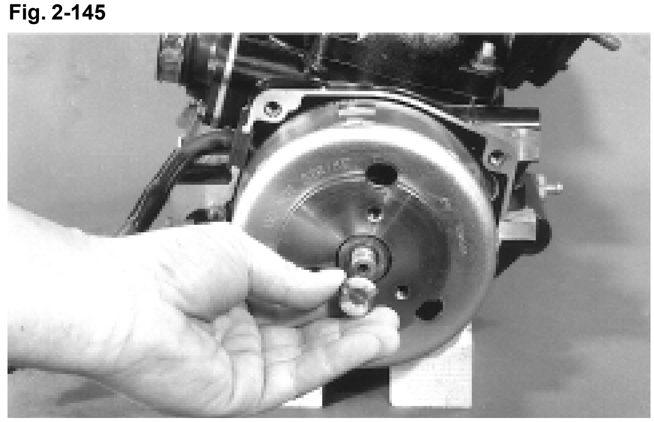
1. Using an impact driver or a 6-mm hex wrench, remove the four cap screws securing the magneto housing to the crankcase.

2. Using a spanner wrench to secure the crankshaft, remove the cap screw, lock washer, and large flat washer securing the flywheel.

3. Remove the three cap screws securing the starter pulley to the flywheel.

4. To prevent damaging the crankshaft threads during the flywheel removal procedure, install a Crankshaft Protector Cap (p/n 0644-234) onto the end of the crankshaft.

Fig. 2-145

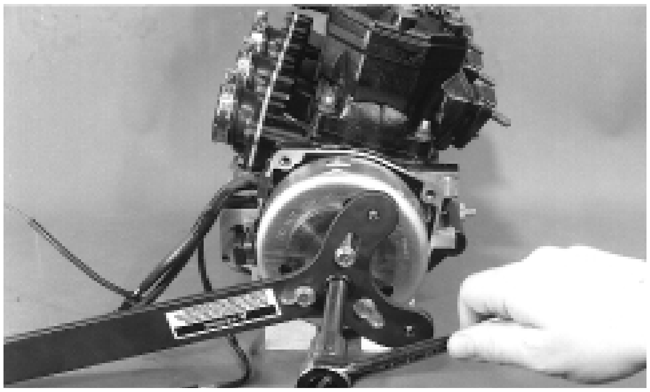


AN162

5. Attach the flywheel puller to the flywheel using three 8-mm cap screws approximately 2 3/4 in. long. Thread each of the three cap screws evenly into the flywheel 1/2 in.

6. Tighten the center puller bolt against the crankshaft protector on the end of the crankshaft. Continue to tighten the puller bolt until the flywheel snaps free of the crankshaft taper. Remove the puller from the flywheel and place the flywheel, open side up, on a clean work bench. Account for the flywheel key.

Fig. 2-146

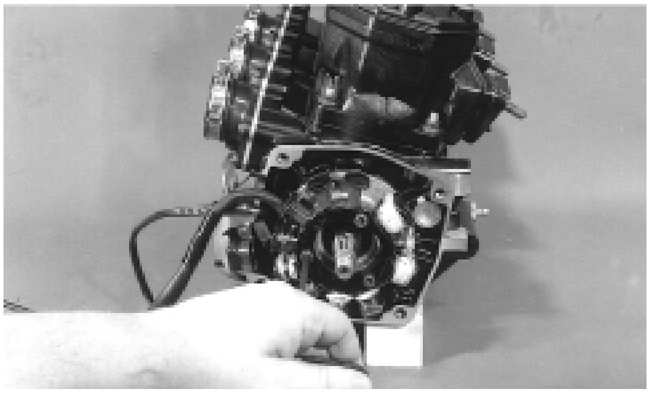


AN161

7. Remove the three Allen-head cap screws securing the stator to the stator plate.

8. Remove the rubber grommet from the crankcase and slide the stator free of the crankshaft.

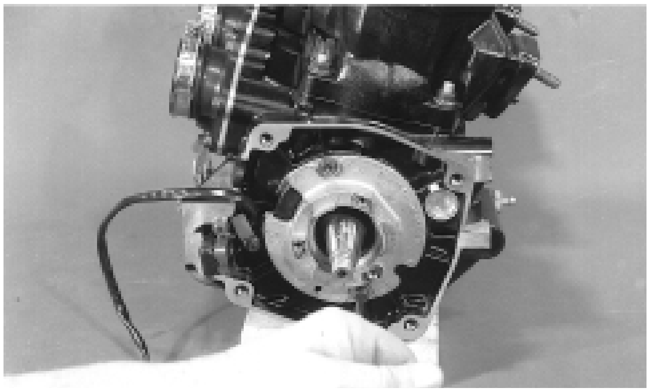
Fig. 2-147



AN160

9. Remove the two Allen-head cap screws securing the stator backing plate to the crankcase.

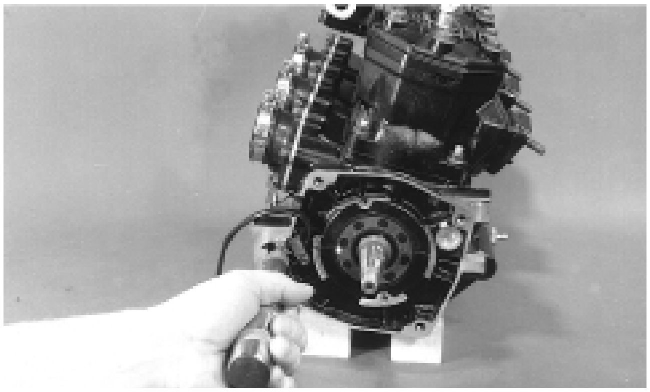
Fig. 2-148



AN158

10. Remove the two screws securing the timing sensor; then loosen the screw securing the wiring harness retainer tab. Remove the timing sensor from the crankcase.

Fig. 2-149



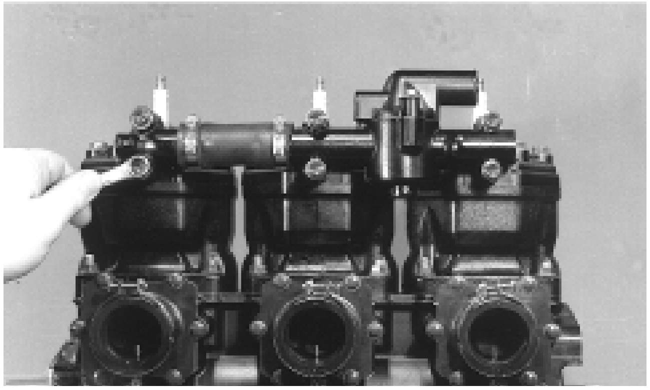
AN157

11. Remove the thermostat cover; then remove the thermostat from the water manifold.

■ **NOTE: The thermostat is designed to open at 50°C (122°F). It should be checked for proper operation before installing (see Section 3).**

12. Remove the water manifold assembly.

Fig. 2-150

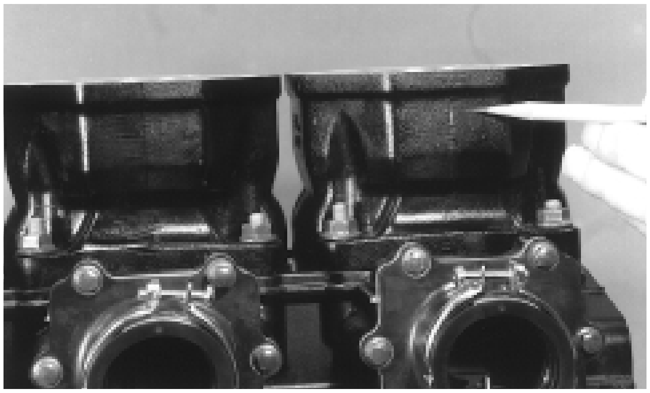


AN156

13. Remove each cylinder head; then account for the two O-rings under each head.

14. For assembly purposes, number the three heads and cylinders using a marker. Start from the MAG-side.

Fig. 2-151

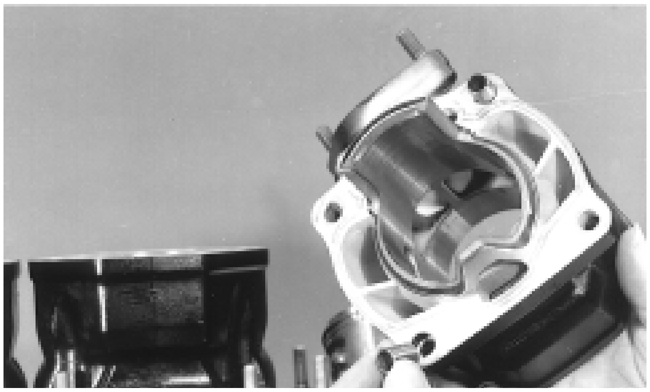


AN209

2

15. Remove the four nuts securing each cylinder to the crankcase; then carefully lift each cylinder straight up and free of the piston. Support the piston as the cylinder clears the piston to prevent the connecting rod from dropping against the crankcase and causing damage to the crankcase sealing surface. Account for two alignment dowel pins per cylinder.

Fig. 2-152



AN207

16. For assembly purposes, number the dome of each piston starting from the MAG-side; then remove the MAG-side circlip from each piston.

Fig. 2-153



AN242

17. Using Piston Pin Puller (p/n 0644-328), remove the piston pin from each piston. Remove the piston, piston pin bearing, and the two shim washers. Keep each piston, piston pin, and bearing together as a set.

Fig. 2-154

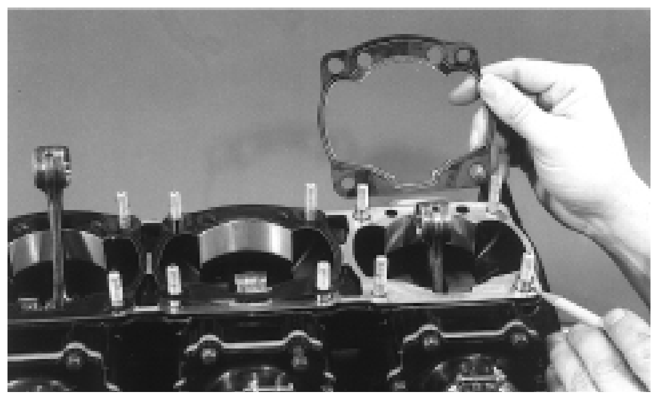


AN241

18. Remove the cylinder base gaskets from the crankcase. Note that the cylinder base gaskets are aligned with the same dowel sleeves which align the cylinders on the crankcase.

■ **NOTE: If the cylinder base gaskets are not damaged, they can be reused.**

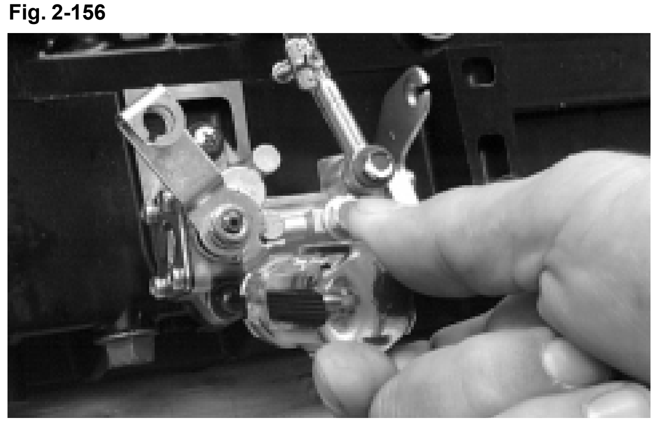
Fig. 2-155



AN239

19. Remove the two screws securing the oil-injection pump to the crankcase. Slide the pump free of the crankcase. Account for the O-ring located around the pump inner flange.

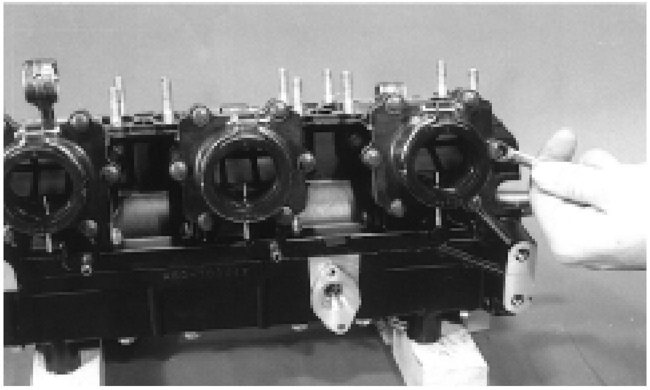
Fig. 2-156



AQ130D

20. Remove the six cap screws securing the intake flanges and reed valve assembly to the crankcase.

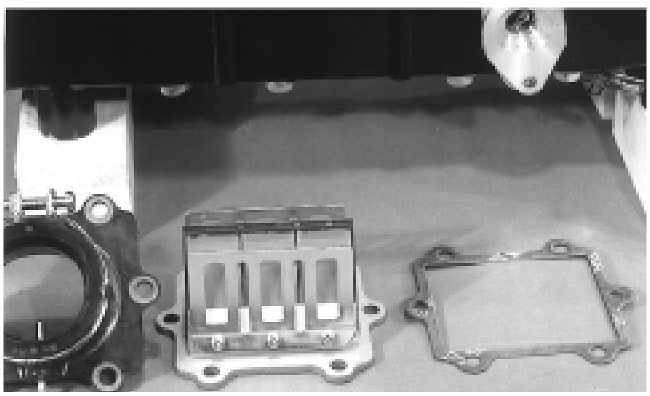
Fig. 2-157



AN237

21. Remove the intake flange and reed valve assembly. Be very careful not to damage the reed valve stops. Place the assembly on its flat side. Remove and discard and reed valve assembly gasket.

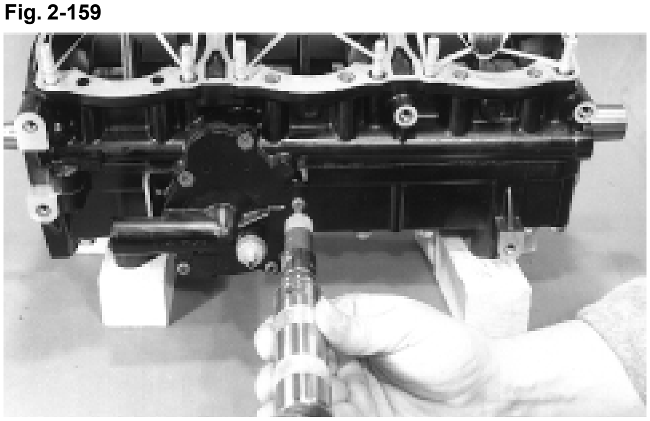
Fig. 2-158



AN236

22. Using an impact driver, remove the five screws securing the water pump cover to the crankcase and remove the cover. Account for the O-ring gasket.

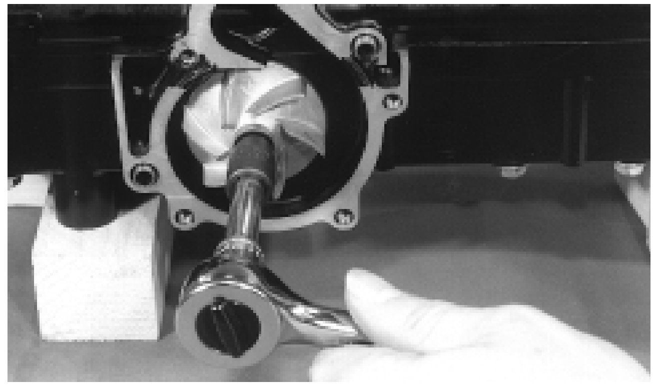
Fig. 2-159



AN234

23. Loosen the cap screw securing the water pump impeller until there is a 1/4-in. space between the cap screw flange and impeller.

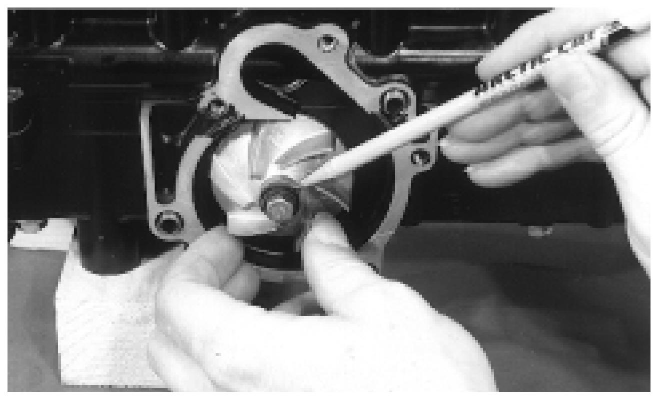
Fig. 2-160



AN233

24. Using a plastic hammer, gently tap on the head of the cap screw until the impeller is free of the shaft. Remove the cap screw and impeller.

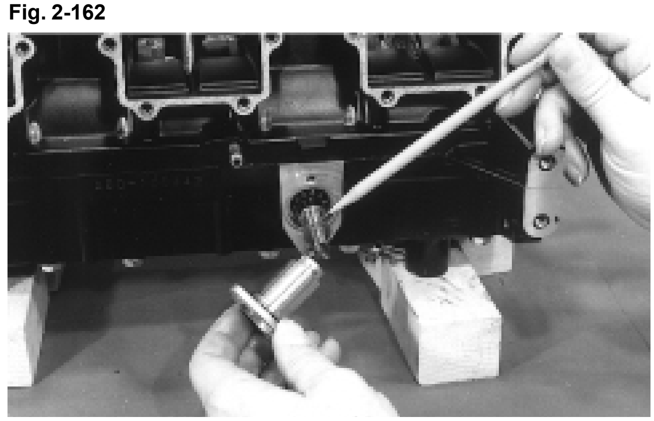
Fig. 2-161



AN232

25. From the opposite side of the crankcase, remove the oil pump retainer and shaft. Account for the shaft thrust washer located between the retainer and shaft flange.

Fig. 2-162

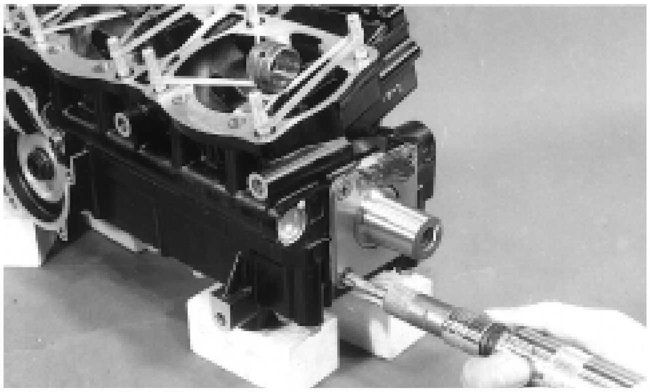


AN231

26. Using an impact driver, remove the four screws securing the seal protector plate to the end of the crankcase; then slide the plate free of the crankshaft.

2

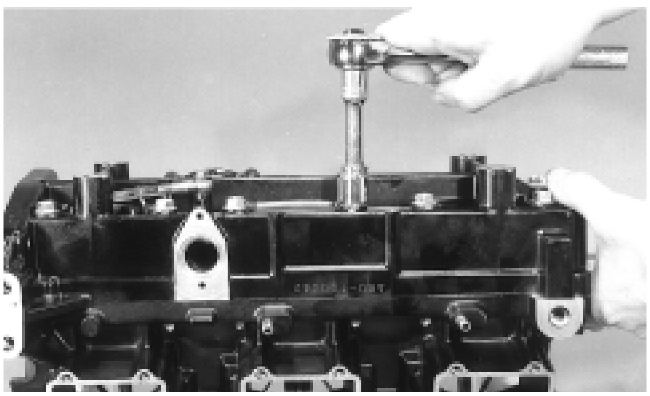
Fig. 2-163



AN230

27. Remove the 14 cap screws securing the two crankcase halves together.

Fig. 2-164

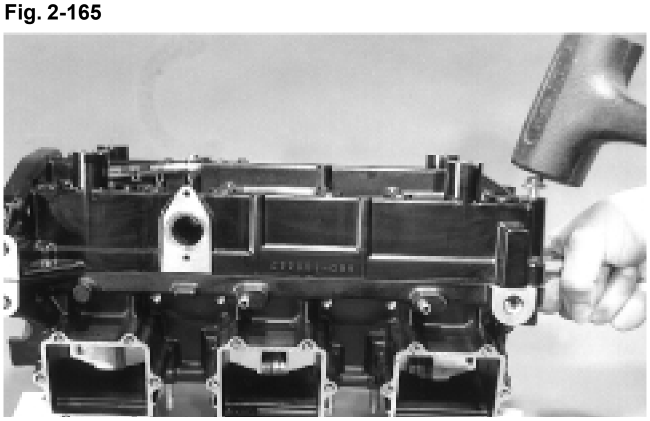


AN229

28. To separate the crankcase halves, start two of the crankcase cap screws into the crankcase at opposite corners. Thread the cap screws into the crankcase until a 6.4 mm (1/4 in.) space remains between the cap screw flange and the crankcase surface.

29. Set the crankcase on its side with the flat reed surfaces resting on the work bench. Using a hammer, strike the heads of the two cap screws alternately driving the two case halves apart.

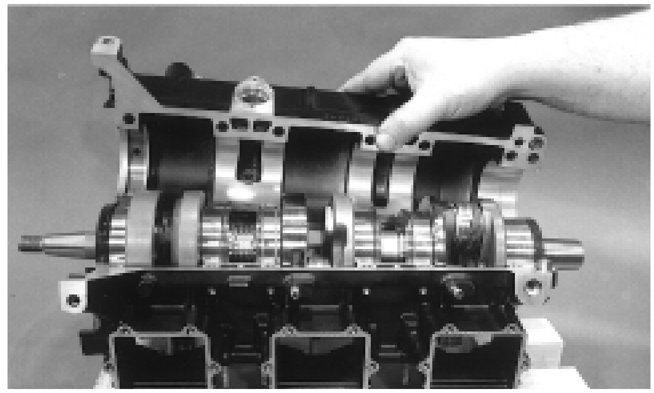
Fig. 2-165



AN227

30. Once there is a 6.4 mm (1/4 in.) space between the two case halves, set the crankcase down on the work bench with its bottom side up. Remove the cap screws; then lift the bottom of the crankcase free of the engine.

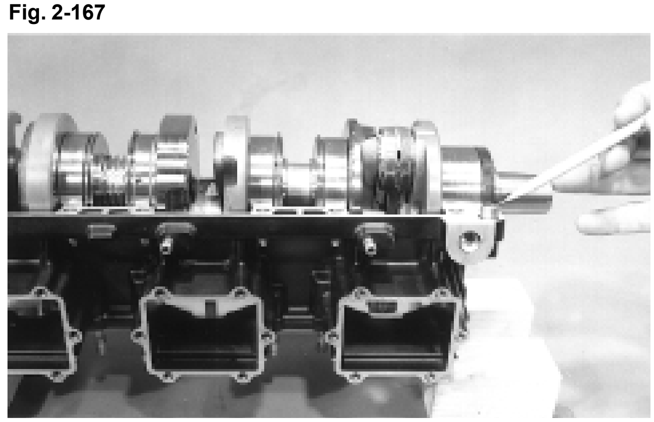
Fig. 2-166



AN221

31. Grasp the crankshaft at either end and carefully lift it from the crankcase. Have a clean area ready to lay the crankshaft on once it has been removed. Account for the two crankcase dowel pins.

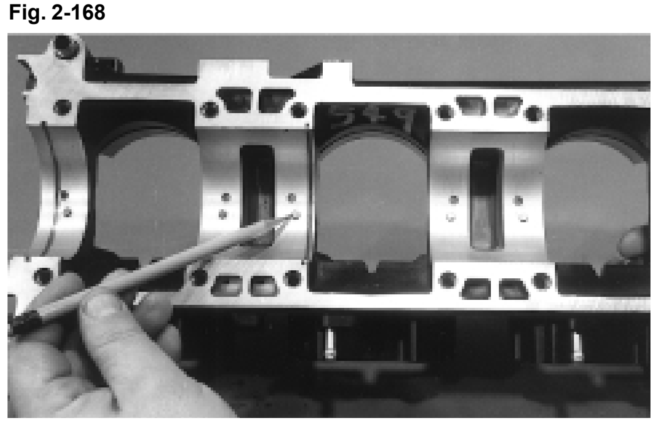
Fig. 2-167



AN222

32. With the crankshaft removed from the top half of the crankcase, remove the seven bearing retaining pins and the C-ring.

Fig. 2-168

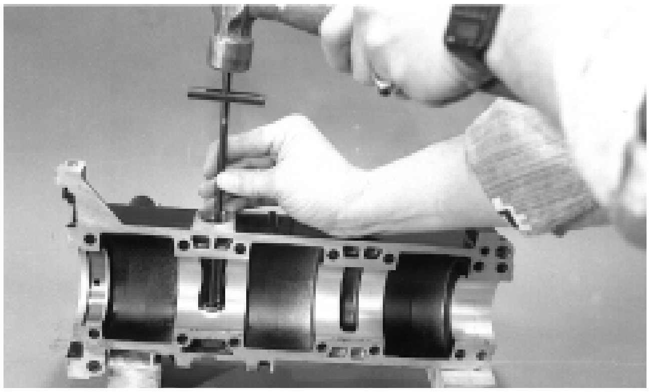


AN223

■ **NOTE: Do not replace the inner oil seal or mechanical seal unless the water pump shows signs of leaking coolant out of the small bleed hole in the bottom half of the crankcase. If a water pump seal is to be replaced, use the Water Pump Bearing and Seal Kit (p/n 0644-084).**

33. Place the crankcase on the bench with the water pump side down. Using the long seal driver, drive the water pump seal from the crankcase.

Fig. 2-169

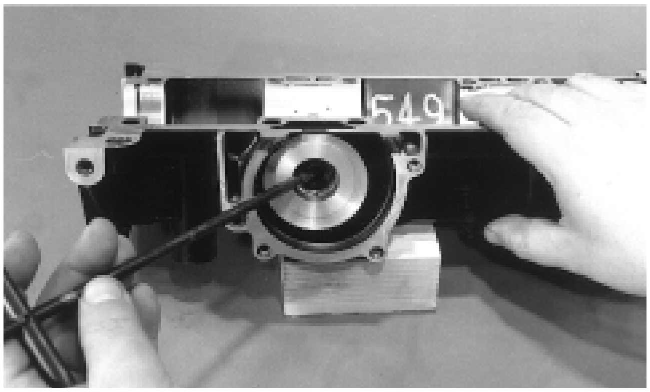


AN226

34. Using a pair of snap ring pliers, remove the snap ring securing the inner seal in the crankcase.

35. Using the hooked end of the seal driver, pull the inner seal free of the crankcase.

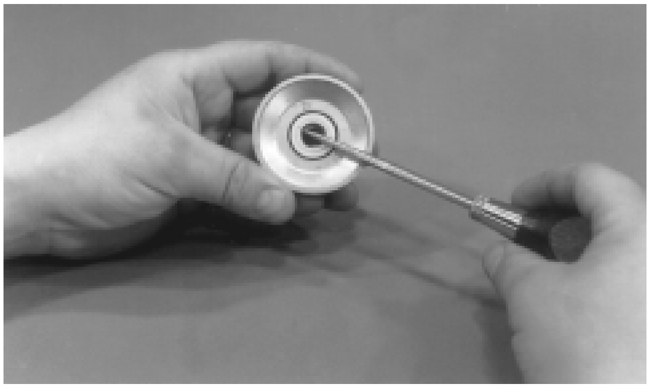
Fig. 2-170



AN224

36. Using a sharp-pointed tool, pry the seal ring from the backside of the water pump impeller.

Fig. 2-171



AN051

Disassembling Engine (800/1000 cc Models)

2

1. Using an impact driver or a 6-mm hex wrench, remove the four cap screws securing the magneto housing to the crankcase. Account for the alignment dowels.

2. Using an impact driver, remove the five screws securing the water pump cover. Remove the cover and account for the O-ring seal and alignment dowels.

Fig. 2-172



AQ005

3. Secure the crankshaft using a spanner wrench; then remove the cap screw securing the water pump impeller.

Fig. 2-173



AQ006

4. Remove the water pump impeller from the counterbalance shaft.

5. With the impeller removed, check the condition of the seal on the back side. It must be free of any cracks, chips, or rough areas.

■ **NOTE: If any rough areas are found, the seal ring can be removed using a small screwdriver. Simply pry the seal ring upward; then remove the rubber cup from beneath the seal ring.**

Fig. 2-174



AQ008

6. Remove the remaining water pump center and back section from the counterbalance shaft.

7. Inspect the front mechanical seal and rear seal surface for any rough areas. If the seals need replacement, see the appropriate Repairing Water Pump in Section 3.

Fig. 2-175



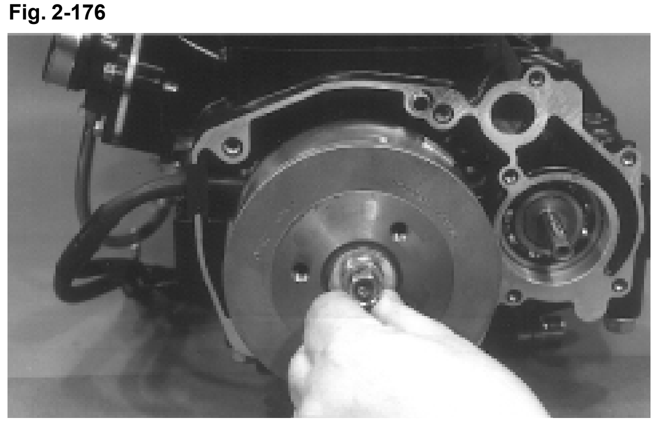
AQ010

8. Using a spanner wrench to secure the crankshaft, remove the cap screw, lock washer, and large flat washer securing the flywheel.

9. Remove the three cap screws securing the starter pulley to the flywheel.

10. To prevent damaging the crankshaft threads during the flywheel removal procedure, use the Puller Insert (p/n 0644-179) on the end of the crankshaft.

Fig. 2-176

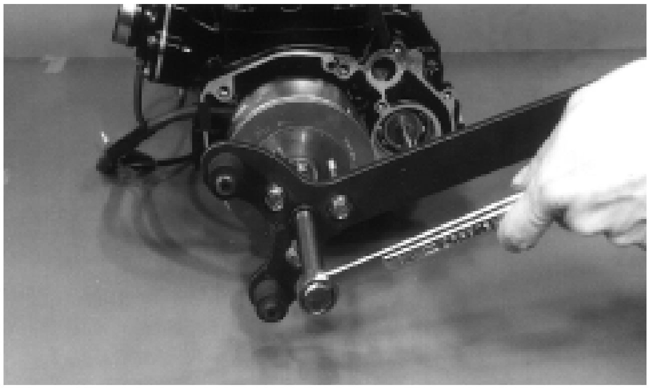


AQ019

11. Attach the flywheel puller to the flywheel using three 8-mm cap screws approximately 2 3/4 in. long. Thread each of the three cap screws evenly into the flywheel 1/2 in.

12. Tighten the center puller bolt against the insert on the crankshaft. Continue to tighten the puller bolt until the flywheel snaps free of the crankshaft taper. Remove the puller from the flywheel and place the flywheel, open side up, on a clean work bench. Account for the flywheel key.

Fig. 2-177

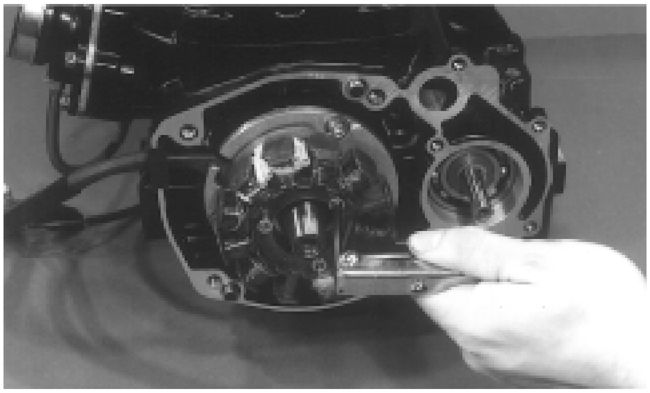


AQ020

13. Remove the Allen-head cap screws securing the stator to the stator plate.

14. Remove the rubber grommet from the crankcase and slide the stator free of the crankshaft.

Fig. 2-178



AQ021

15. Remove the three Allen-head cap screws securing the stator plate to the crankcase.

16. Remove the thermostat cover; then remove the thermostat from the water manifold.

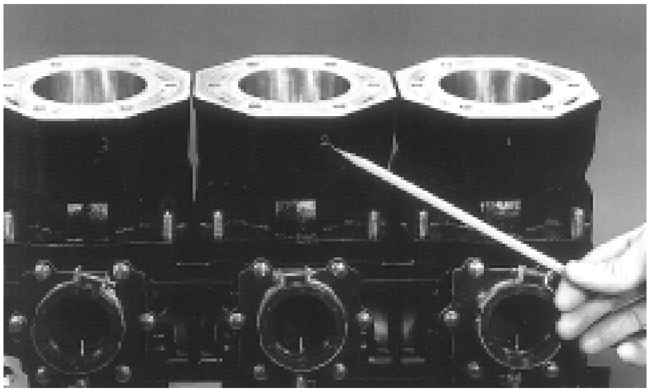
■ **NOTE: The thermostat is designed to open at 50°C (122°F). It should be checked for proper operation before installing (see Section 3).**

17. Remove the water manifold assembly.

18. Remove the heads from the cylinders. Account for the two O-rings under each head.

19. For assembly purposes, number the three heads and cylinders. Start from the MAG-side.

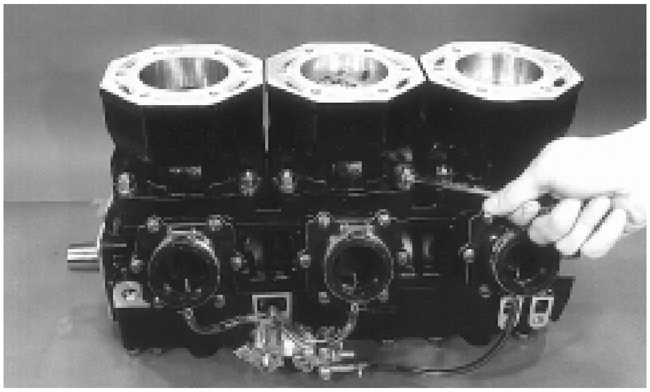
Fig. 2-179



AQ026

20. Remove the four nuts, lock washers, and flat washers securing each cylinder to the crankcase; then carefully lift each cylinder straight up and free of the piston. Support the piston as the cylinder clears the piston to prevent the connecting rod from dropping against the crankcase and causing damage to the crankcase sealing surface.

Fig. 2-180



AQ027

21. For assembly purposes, number the dome of each piston starting from the MAG-side; then remove the MAG-side circlip from each piston.

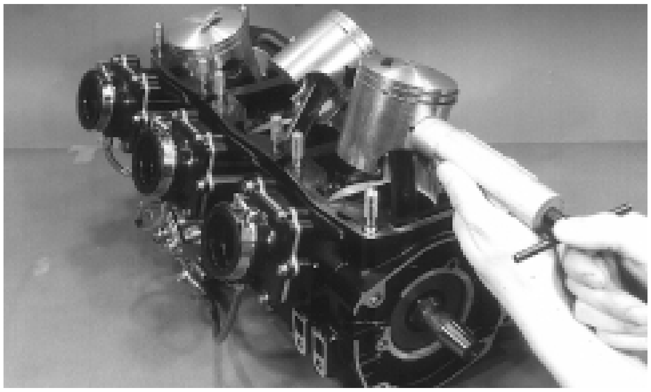
Fig. 2-181



AQ028

22. Using Piston Pin Puller (p/n 0644-328), remove the piston pin from each piston. Remove the piston, piston pin bearing, and the two shim washers. Keep each piston, piston pin, and bearing together as a set.

Fig. 2-182

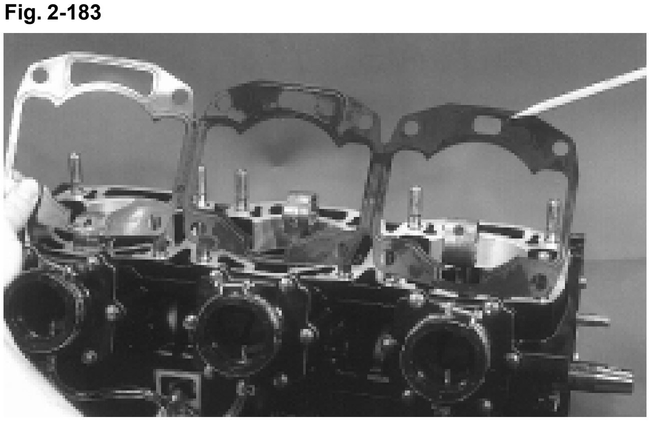


AQ029

23. Before lifting the cylinder base gasket from the crankcase, note how it is installed. The smaller of the three water passage holes must be positioned to the MAG-side of the crankcase when installing. Lift the gasket free of the crankcase.

■ **NOTE: If the cylinder base gasket is not damaged, it can be reused.**

Fig. 2-183

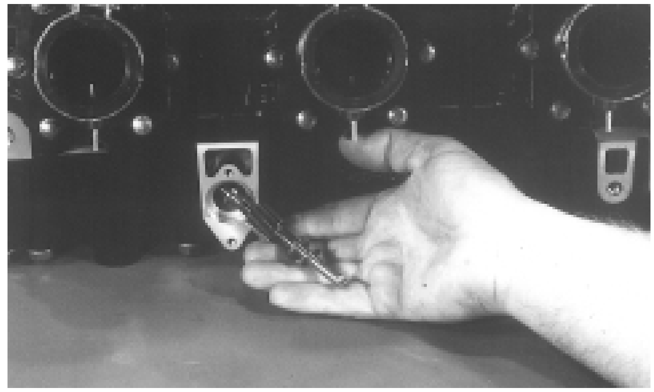


AQ030

24. Remove the two screws securing the oil-injection pump to the crankcase. Slide the pump free of the crankcase. Account for the O-ring located around the pump inner flange.

25. Remove the pump retainer and shaft. Account for the shaft thrust washer.

Fig. 2-184

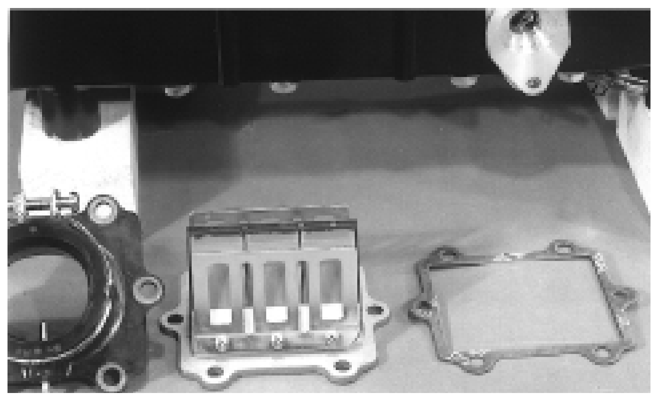


AQ119

26. Remove the six cap screws securing the intake flanges and reed valve assembly to the crankcase.

27. Remove the intake flange and reed valve assembly. Be very careful not to damage the reed valve stops. Place the assembly on its flat side. Remove and discard the reed valve assembly gasket.

Fig. 2-185



AN236

28. Using an impact driver, remove the four screws securing the PTO-end plate to the end of the crankcase; then slide the plate free of the crankshaft.

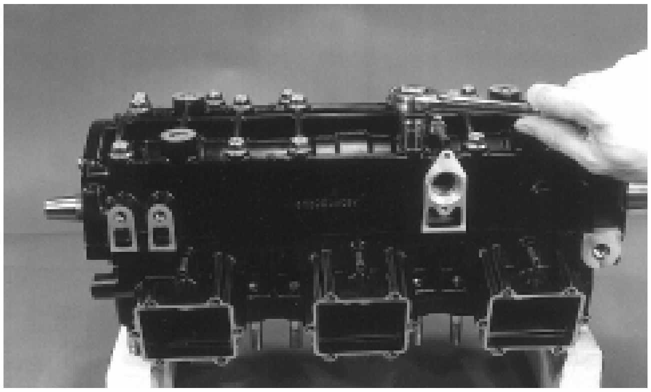
Fig. 2-186



AQ034

29. Remove the twenty cap screws securing the two crankcase halves together.

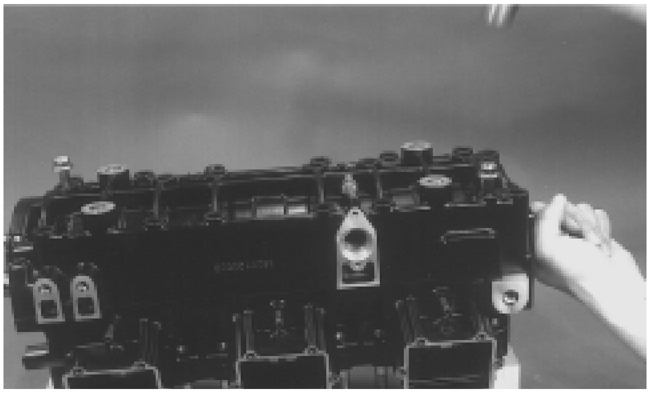
Fig. 2-187



AQ035

30. To separate the crankcase halves, start two of the crankcase cap screws into the crankcase at opposite corners. Thread the cap screws into the crankcase until a 6.4 mm (1/4 in.) space remains between the cap screw flange and the crankcase surface.

Fig. 2-188

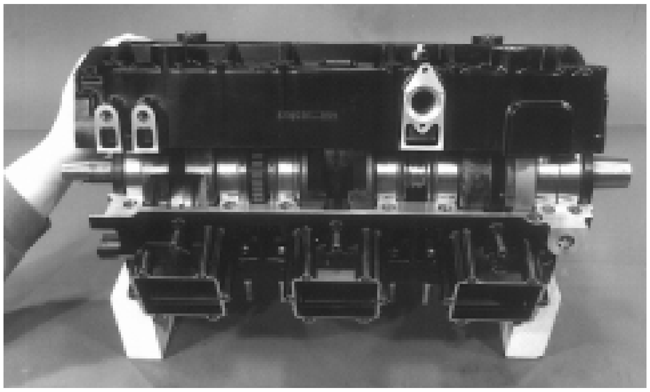


AQ036

31. Set the crankcase on its side with the flat reed surfaces resting on the work bench. Using a plastic hammer, strike the heads of the two cap screws alternately driving the two case halves apart.

32. Once there is a 6.4 mm (1/4 in.) space between the two case halves, set the crankcase down on the work bench with its bottom side up. Remove the cap screws; then lift the bottom of the crankcase free of the engine.

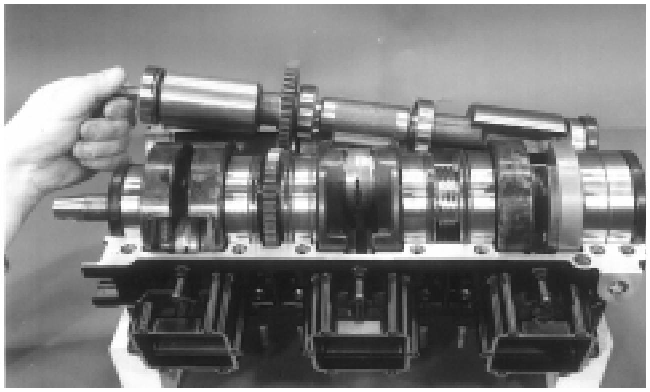
Fig. 2-189



AQ037

33. Remove the balancer shaft from the crankcase. Notice that it has a timing mark located on the side of the drive gear. This timing mark must be aligned with the crankshaft gear during assembly.

Fig. 2-190

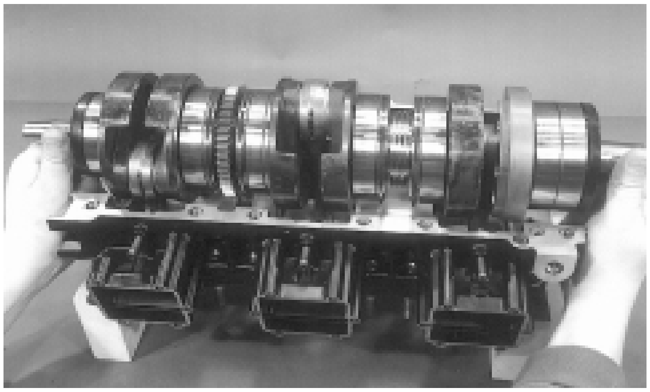


AQ038

34. Remove the balancer shaft end seals from the crankcase.

35. Grasp the crankshaft at either end and carefully lift it from the crankcase. Have a clean area ready to lay the crankshaft on once it has been removed.

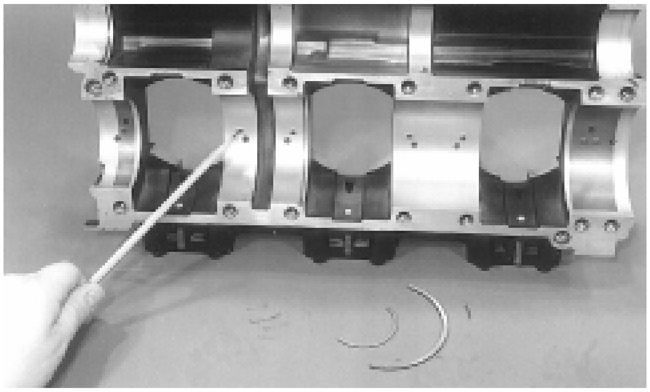
Fig. 2-191



AQ039

36. With the crankshaft removed from the top half of the crankcase, remove the seven bearing dowel pins and the two C-rings.

Fig. 2-192



AQ040

2

Cleaning and Inspecting Engine

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

CYLINDER HEADS

1. Using a non-metallic carbon removal tool, remove any carbon buildup from the combustion chambers being careful not to nick, scrape, or damage the combustion chambers or the sealing surfaces.

2. Inspect the spark-plug holes for any damaged threads. Repair damaged threads using a "heli-coil" insert.

3. Place the cylinder heads on a Surface Plate (p/n 0644-016) covered with #400 grit wet-or-dry sandpaper. Using light pressure, move each cylinder head in a figure eight motion. Inspect the sealing surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the cylinder head in a figure eight motion until a uniform bright metallic finish is attained.

Fig. 2-193



AQ132D

⚠ CAUTION
Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.

CYLINDER HEAD (500/600 cc)

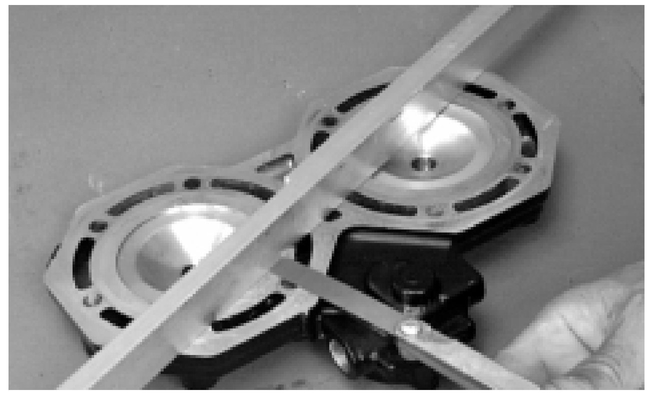
1. Using a non-metallic carbon removal tool, remove any carbon buildup from the combustion chambers being careful not to nick, scrape, or damage the combustion chambers or the sealing surfaces.

2. Inspect the spark-plug holes for any damaged threads. Repair damaged threads using a "heli-coil" insert.

3. Inspect the cylinder head for flatness using a straightedge and a feeler gauge. Acceptable warpage must not exceed 0.05 mm (0.002 in.).

■ **NOTE: If the warpage exceeds specification, resurface the cylinder head using procedures identified in step 6 in the Crankcase subsection of Cleaning and Inspecting Engine.**

Fig. 2-194



AN426D

⚠ CAUTION
Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.

CYLINDERS

1. Using a non-metallic carbon removal tool, remove carbon buildup from the exhaust ports.

2. Wash the cylinders in parts-cleaning solvent.

3. Inspect the cylinders for pitting, scoring, scuffing, and corrosion. If marks are found, repair the surface with Ball Hone (p/n 0644-036) for the 600 cc or (p/n 0644-037) for the 800 cc or with #500 grit stones and honing oil.

Fig. 2-195



AN053

■ **NOTE: To produce the proper 60° "crosshatch" pattern, use a low RPM drill (600 RPM) at the rate of 30 strokes per minute. If honing oil is not available, use a lightweight, petroleum-based oil. Thoroughly clean the cylinders after honing using detergent soap and hot water and dry with compressed air; then immediately apply oil to the cylinder bores. If a bore is severely damaged or gouged, the cylinder will have to be replaced.**

4. Place the head surface of each cylinder on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move each cylinder in a figure eight motion. Inspect the surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the cylinder in a figure eight motion until a uniform bright metallic finish is attained.

> ⚠ **CAUTION**
>
> **Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.**

PISTON ASSEMBLY

1. Using a non-metallic carbon removal tool, remove the carbon buildup from the dome of each piston.
2. Take an old piston ring and snap it into two pieces; then grind the end of the old ring to a 45° angle and to a sharp edge. Using the sharpened ring as a tool, clean carbon from the ring-grooves. Be sure to position the ring with its tapered side up.

> ⚠ **CAUTION**
>
> **Improper cleaning of the ring-grooves by the use of the wrong type of ring-groove cleaner will result in severe damage to the piston.**

3. Inspect each piston for cracks in the piston pin and skirt areas.
4. Inspect each piston for seizure marks or scuffing. Repair with #400 grit wet-or-dry sandpaper and water or honing oil.

Fig. 2-196



AN135

■ **NOTE: If scuffing or seizure marks are too deep to correct with the sandpaper, it will be necessary to replace the piston.**

5. Inspect the perimeter of each piston for signs of excessive "blowby." Excessive "blowby" indicates worn piston rings or an out-of-round cylinder.

CRANKCASE

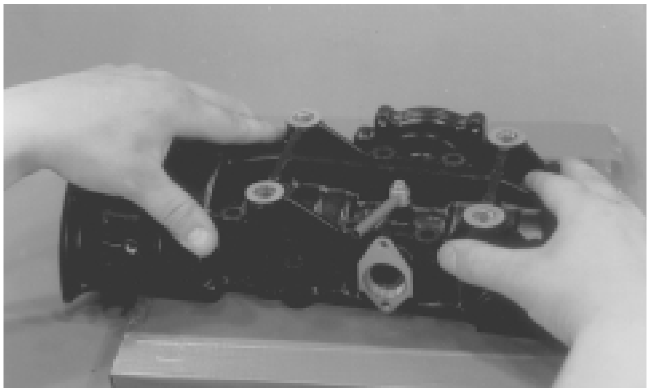
1. Wash the crankcase halves in parts-cleaning solvent.

■ **NOTE: Before washing the crankcase halves, make sure the four bearing dowel pins have been removed and accounted for.**

2. Inspect the crankcase halves for scoring, pitting, scuffing, or any imperfections in the casting.
3. Inspect all threaded areas for damaged or stripped threads.
4. Inspect the bearing areas for cracks or excessive bearing movement. If evidence of excessive bearing movement is noted, repair by peening the bearing area in a pinking (sawtooth) pattern.
5. Inspect the bearing dowel pins for wear.
6. Inspect the sealing surfaces of the crankcase halves for trueness by placing each crankcase half on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move each half in a figure eight motion. Inspect the sealing surfaces for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots by continuing to move the half in a figure eight motion until a uniform bright metallic finish is attained.

■ **NOTE: Care must be taken not to remove an excessive amount of aluminum, or the crankcase will have to be replaced. If excessive aluminum is removed, too much pre-load will be exerted on the crankshaft bearings when assembled.**

Fig. 2-197



AN060

> ⚠ **CAUTION**
>
> **Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.**

INTAKE MANIFOLD INSULATORS (Single Carburetor)/ ADAPTER PLATES (Twin Carburetor)

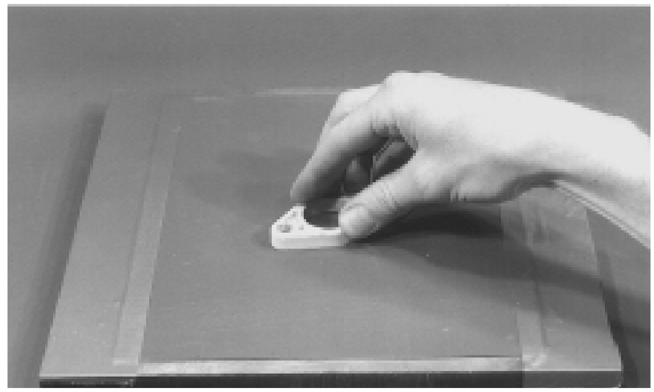
■ **NOTE: For fan cooled models only.**

1. Inspect for cracks, scoring, pitting, imperfections, or warping.
2. Inspect the sealing surfaces for trueness by placing each on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move both sides in a figure eight motion. Inspect the sealing surface for any indication of high spots or warping. Correct high spots by continuing to move each side in a figure eight motion. Warped components must be replaced.

■ **NOTE: On the twin carburetor model in order to inspect adapter plate trueness, it will be necessary to remove the studs.**

> ⚠ **CAUTION**
>
> **Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surfaces may result.**

Fig. 2-198

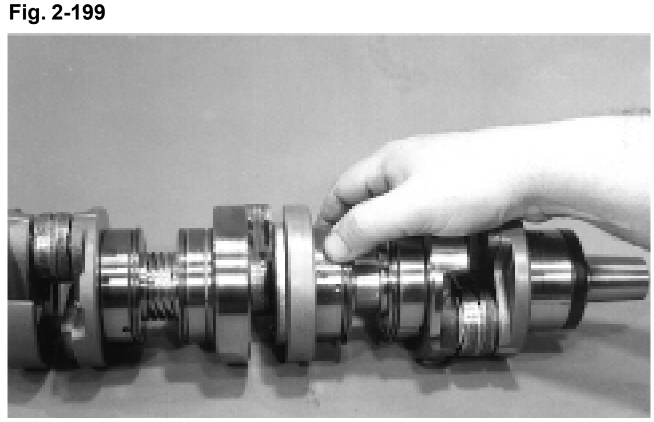


A932

CRANKSHAFT

1. Wash the crankshaft with bearings in parts-cleaning solvent.
2. Inspect the bearings for wear, scoring, scuffing, damage, or discoloration. Rotate the bearings. Bearings must rotate freely and must not bind or feel rough. If any abnormal condition is noted, replace the bearing.

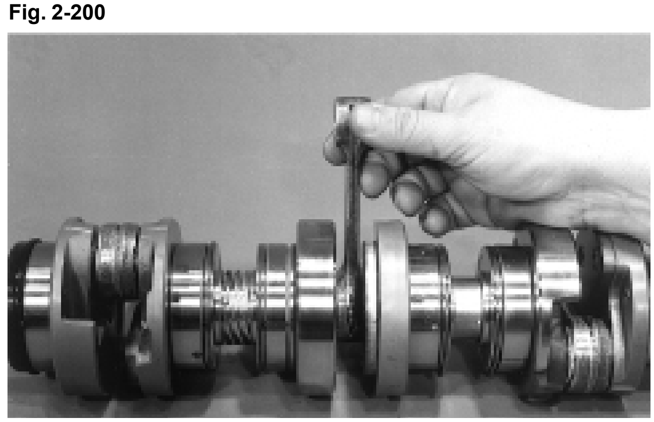
Fig. 2-199



AN218

3. Inspect the connecting-rod bearings by rotating them. The bearings must rotate freely and must not bind or feel rough. If a connecting-rod bearing must be replaced, the connecting rod and crank pin must also be replaced.

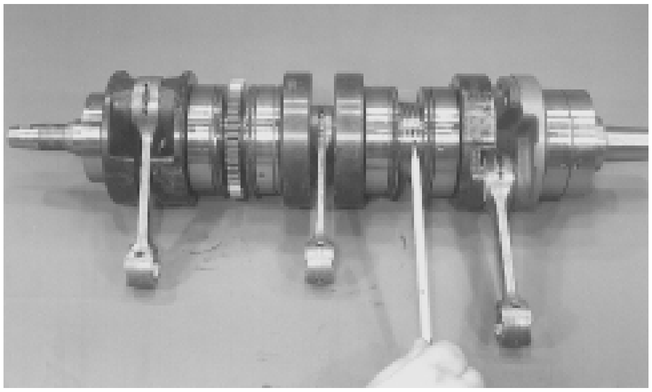
Fig. 2-200



AN217

4. Inspect the oil-injection pump drive gear for any signs of worn or chipped teeth. If either condition exists, replace the gear.

Fig. 2-201



AQ043

■ **NOTE: Lubricate bearings thoroughly prior to assembly.**

REMOVING OUTER CRANKSHAFT BEARINGS

⚠ WARNING

Safety glasses must be worn when spreading bearings.

■ **NOTE: Steps 1-3 are for removing the MAG-side bearing.**

1. Place a bearing support (block of wood, etc.) beneath the MAG-side bearing.

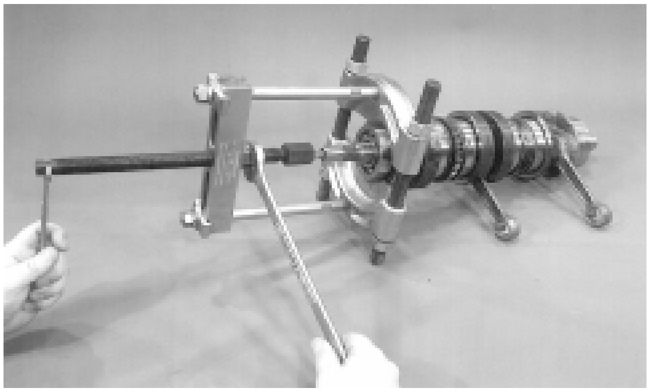
⚠ CAUTION

A bearing support must be positioned beneath the bearing that is being removed to prevent crankshaft damage.

2. Drive a chisel or bearing splitter between the bearing race and crankshaft counterweight until the bearing is spread far enough to install the jaws of the crankshaft bearing remover.

3. Place the protective cap on the crankshaft end; then using the Crankshaft Bearing Remover (p/n 0144-302), remove the bearing from the end of the crankshaft. Account for any shim(s). Note the position of the dowel pin hole.

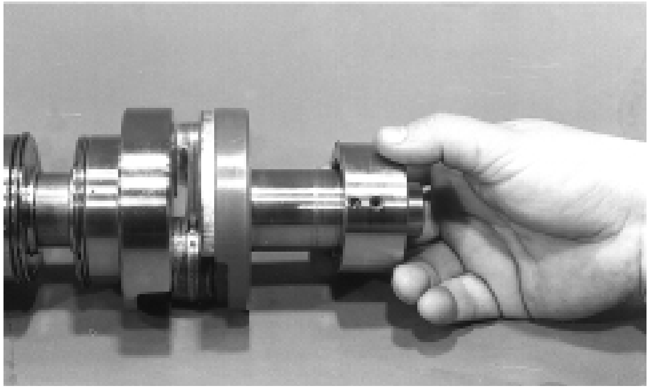
Fig. 2-202



AQ045

4. The PTO-side bearing may be removed simply by sliding the bearing off the PTO end.

Fig. 2-203



AN151A

5. Inspect the crankshaft bearing area for wear. If any wear is noted on either end, replace the crankshaft end.

INSTALLING OUTER CRANKSHAFT BEARINGS

■ **NOTE: Steps 1-3 are for installing the MAG-side bearing.**

1. Wrap a thick towel around the crankshaft; then secure the crankshaft vertically in a vise.

2. Heat the bearing either by placing the entire bearing in a pan of oil on a hot plate or by squirting oil into the bearing and using a propane torch to heat the inner race of the bearing until a slight smoke is noted coming from the bearing.

⚠ CAUTION

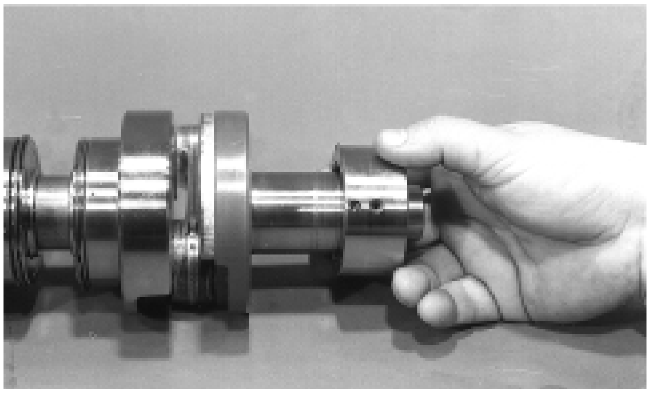
DO NOT overheat the bearing.

2

3. Place any shims removed during disassembly onto the crankshaft; then slide the bearing onto the crankshaft making sure the dowel-pin hole in the outer race is properly positioned and will align with its hole and pin in the crankcase.

4. Slide the PTO-side bearing onto the PTO end making sure the dowel-pin hole will align with the hole and pin in the crankcase.

Fig. 2-204

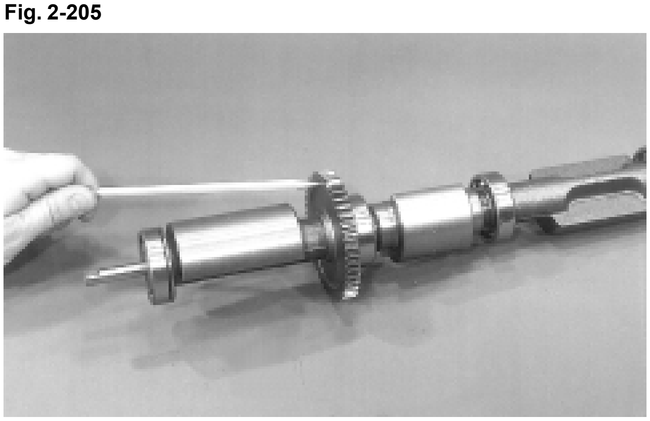


AN151A

BALANCER SHAFT (800/1000 CC)

1. Inspect the balancer shaft bearings by rotating them by hand. The bearings must rotate freely without binding or feeling rough. If either condition exists, replace the bearing. Inspect the balancer gear very closely for any chipped teeth or signs of wear. If either condition exists, replace the gear.

Fig. 2-205

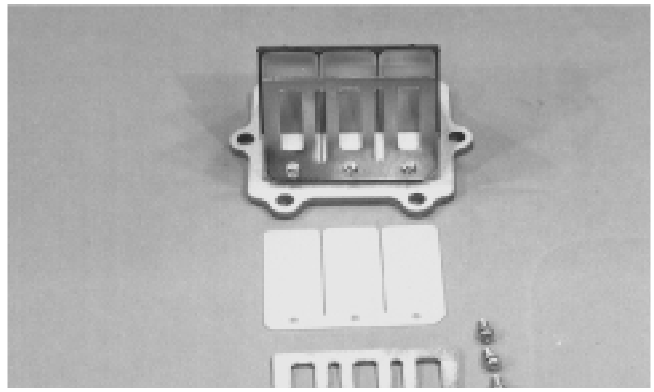


AQ044

REED ASSEMBLY

1. Inspect the reed valves, stoppers, and valve blocks for cracks or any deterioration.

Fig. 2-206

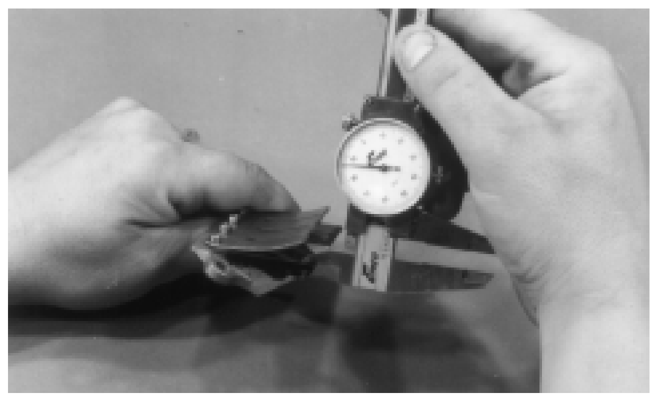


AQ046

2. Wash the reed valves, stopper, and cage assembly in parts-cleaning solvent and blow dry.

3. Inspect the reed stopper height. Using a caliper, measure the distance from the seat to the bottom outer tip edge of the stopper. Measurement must not exceed specifications. If measurement is not within specifications, either bend or replace the reed stopper.

Fig. 2-207

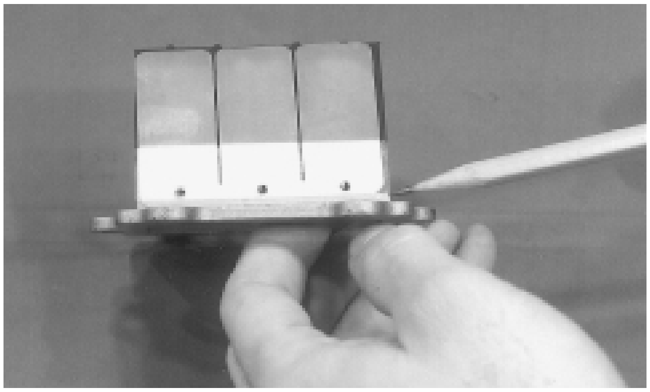


AJ156

4. Inspect the reed-to-seat clearance. Using a feeler gauge, measure the clearance. Clearance must be less than 0.20 mm (0.008 in.). If clearance is not within specifications, replace the reed valve.

5. To assemble, place the reed valves on the cage with its clipped corner positioned to the lower right hand corner of the cage. Place the reed stopper assembly into position and secure with the three screws coated with red Loctite #271.

Fig. 2-208



AQ047

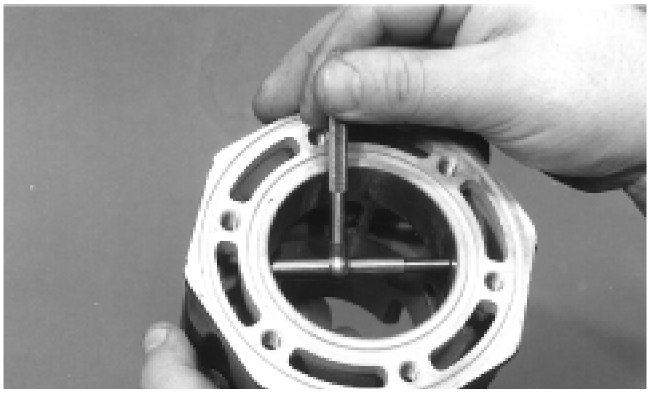
Measuring Critical Components

■ **NOTE: Critical engine component specifications are on pages 51-52 of this section.**

CYLINDER TRUENESS

1. Measure each cylinder in the three locations from front to back and side to side for a total of six readings.

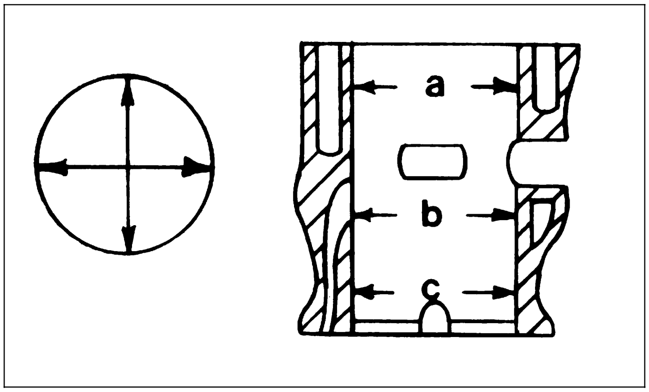
Fig. 2-209



AN302

2. The trueness (out-of-roundness) is the difference between the highest and lowest reading. Maximum trueness (out-of-roundness) must not exceed specifications.

Fig. 2-210



0725-586

CYLINDER TRUENESS LIMIT (max)	
mm	in.
0.10	0.004

PISTON SKIRT/CYLINDER CLEARANCE

1. Measure each cylinder front to back about 2.5 cm (1 in.) from the bottom of each cylinder.

2. Measure the corresponding piston skirt diameter at a point 1 cm (0.394 in.) above the piston skirt at a right angle to the piston-pin bore. Subtract this measurement from the measurement in step 1. The difference (clearance) must be within specifications.

Fig. 2-211



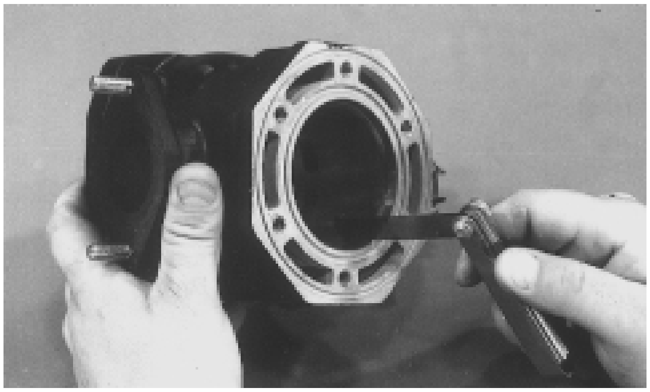
AC091

PISTON-RING END GAP

1. Place each piston ring in the wear portion above the exhaust port of its respective cylinder. Use the piston to position each ring squarely in each cylinder.

2. Using a feeler gauge, measure each piston-ring end gap. Acceptable ring end gap must be within specifications.

Fig. 2-212

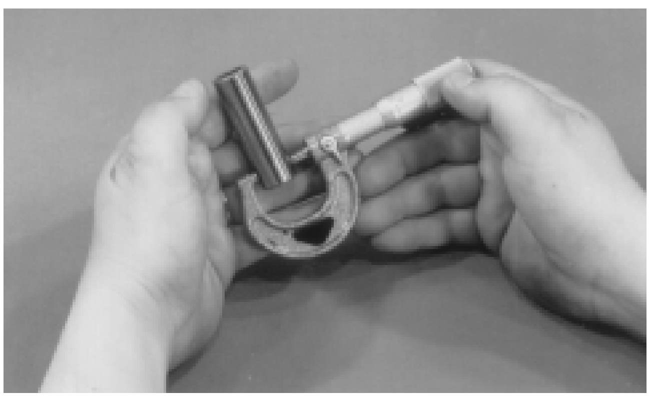


AN057

PISTON PIN AND PISTON-PIN BORE

1. Measure the piston pin diameter at each end and in the center. Acceptable piston pin measurement must be within specifications. If any measurement varies by more than 0.02 mm (0.001 in.), the piston pin and bearing must be replaced as a set.

Fig. 2-213



AN056

2. Insert a snap gauge into each piston-pin bore; then remove the gauge and measure it with a micrometer. The diameter measurement must be within specifications. Take two measurements to ensure accuracy.

Fig. 2-214

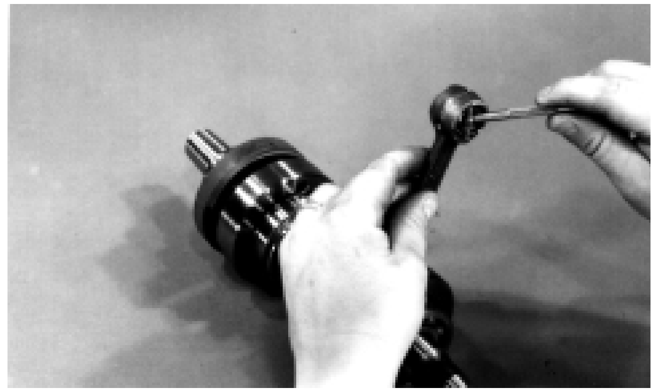


AC092

CONNECTING-ROD SMALL END BORE

1. Insert a snap gauge into each connecting-rod small end bore; then remove the gauge and measure it with a micrometer.

Fig. 2-215



AN061

2. The diameter measurement must be within specifications.

CRANKSHAFT RUNOUT

1. Using the V Blocks (p/n 0644-022), support the crankshaft on the surface plate.

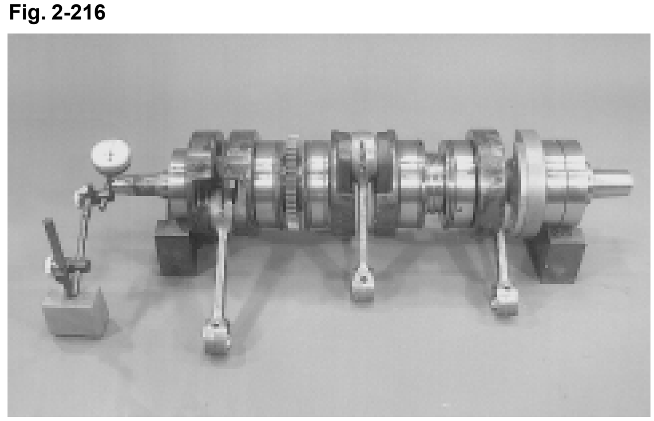
■ **NOTE: The V blocks should support the crankshaft on the outer bearings.**

2. Mount a dial indicator and base on the surface plate. Position the indicator contact point against the crankshaft distance F (PTO-end) from the crankshaft end. Zero the indicator and rotate the crankshaft slowly. Note the amount of crankshaft runout (total indicator reading).

■ **NOTE: For runout distance specifications, see pages 143-144 of this section.**

3. Position the indicator contact point against the crankshaft distance D (MAG-end) from the crankshaft end. Zero the indicator and rotate the crankshaft slowly. Note the amount of crankshaft runout (total indicator reading).

Fig. 2-216



AQ042

4. Position the indicator contact point against the crankshaft at point E (center). Zero the indicator and rotate the crankshaft slowly. Note the amount of crankshaft runout (total indicator reading).

CRANKSHAFT RUNOUT (max) (total indicator reading)	
mm	**in.**
0.05	0.002

5. If runout exceeds specifications at any of the checkpoints, the crankshaft must be either straightened or replaced.

1999 Engine Specifications (60 cc)

2

ITEM	SPECIFICATIONS
Model	AP06A2
Type	2 Cycle, Air-Cooled
No. of Cylinders	1
Bore x Stroke	41 x 45 mm (1.614 x 1.772 in.)
Displacement	59 cc (3.6 cu in.)
Compression Ratio	6.6:1
Cylinder Trueness (max)	0.1 mm (0.004 in.)
Piston Ring End Gap Range	0.1-0.8 mm (0.004-0.031 in.)
Piston Skirt/Cylinder Clearance Range	0.07-0.15 mm (0.0028-0.0059 in.)
Piston Pin Diameter Range	11.996-12.000 mm (0.4723-0.4724 in.)
Piston Pin Bore Diameter Range	12.000-12.010 mm (0.4724-0.4728 in.)
Connecting Rod Small End Diameter Range	16.003-16.011 mm (0.6300-0.6304 in.)
Crankshaft Runout (max)	0.05 mm (0.002 in.)
Crankshaft End Play Range	0.05-0.10 mm (0.002-0.004 in.)

Assembling Engine Table of Contents

60 cc Model 2-53
F/C Models 2-58
440 LC/550 cc Models 2-64
500/580/600 cc Twin Models 2-70
700 cc Models 2-76
600 cc Triple Models 2-85
800/1000 cc Models 2-92

Assembling Engine
(60 cc Model)

CRANKCASE/GEAR CASE

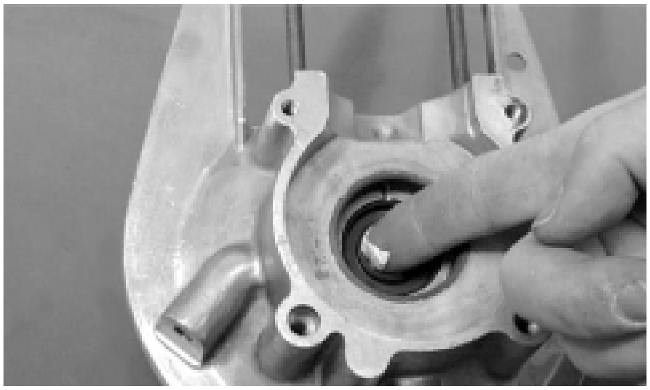
1. If the bearings were removed, install the bearings into the crankcase halves.

2. Using a seal installing tool, insert the seals into the crankcase halves.

■ **NOTE: Make sure the spring side of seal is positioned toward the center of the crankshaft.**

3. Apply grease to the inner lips of the seals.

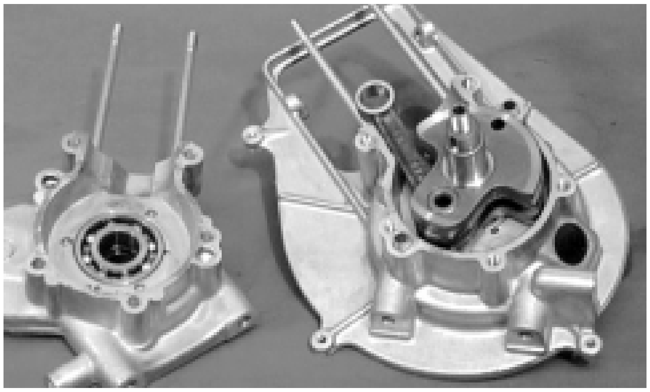
Fig. 2-217



A744

4. Press the crankshaft into MAG-end of case.

Fig. 2-218



A742

5. Apply High-Temp Sealant (p/n 0636-069) to one half of the crankcase.

Fig. 2-219

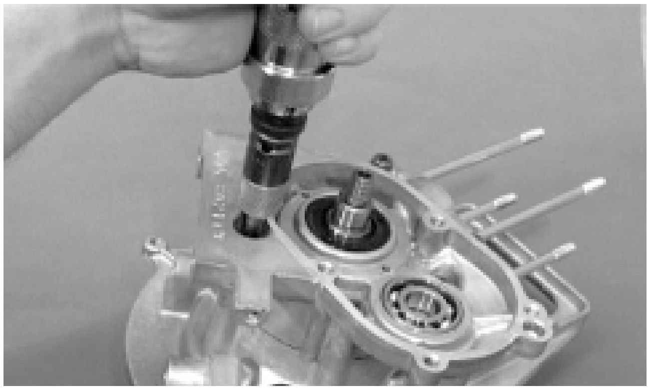


A743

6. If removed, install crankcase dowel pins.

7. Apply blue Loctite #242 to the five crankcase cap screws; then assemble the crankcase. Tighten to 0.6-1 kg-m (4.5-7 ft-lb).

Fig. 2-220

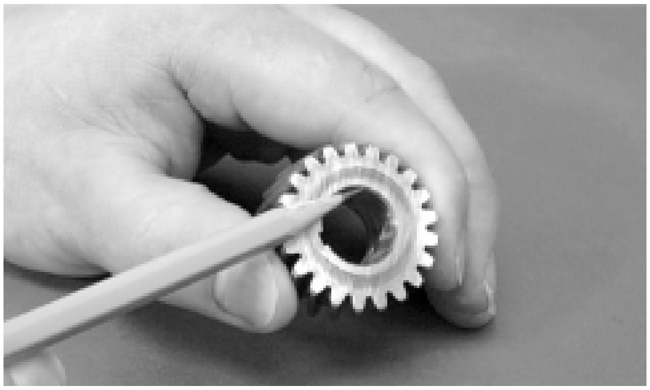


A745

■ **NOTE: Place a rubber band over the connecting rod to prevent the rod from damaging the crankcase if the crankshaft is accidentally rotated.**

8. Install the key in the PTO-end of the engine crankshaft. Slide the drive gear onto crankshaft so the large beveled edge is positioned inward.

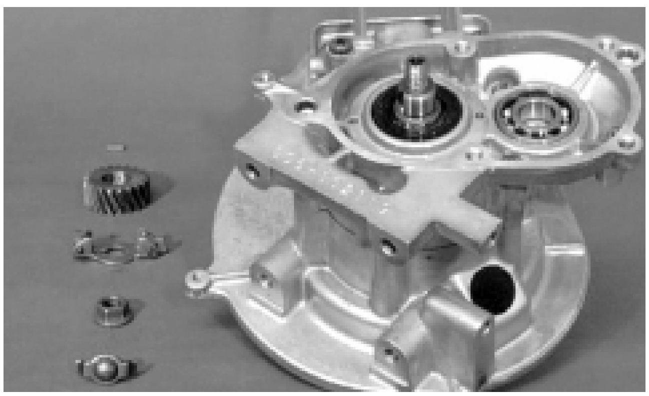
Fig. 2-221



A746

9. Place the centrifugal onto the PTO-end of crankshaft making sure the notch of the centrifugal aligns with keyway of the crankshaft.

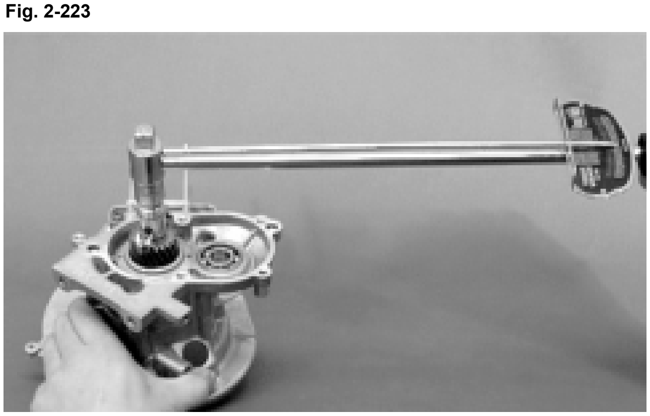
Fig. 2-222



A747

10. Secure the PTO-end crankshaft components by applying blue Loctite #242 to the nut, installing the PTO-end nut, and tightening the nut to 3-4 kg-m (22-29 ft-lb).

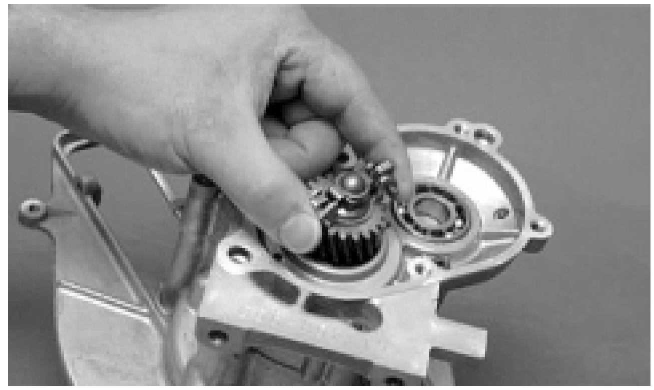
Fig. 2-223



A749

11. Install the shifter so the centrifugal weights are positioned against the shifter arms.

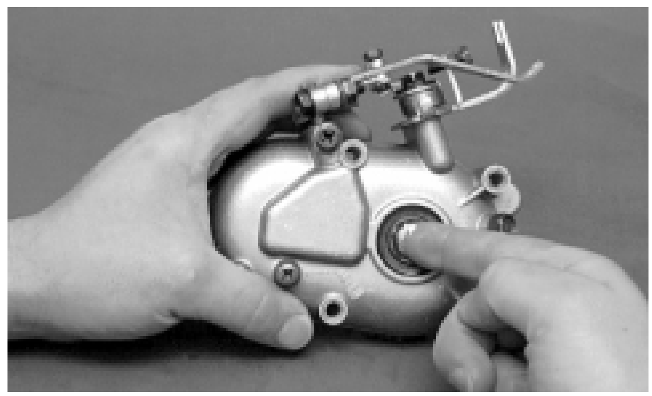
Fig. 2-224



A750

12. Install the bearing in the gear case housing. Apply grease to the inner lips of the seal; then place the seal into position.

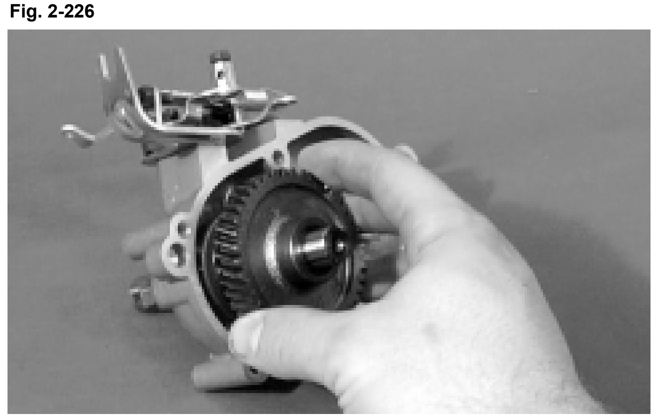
Fig. 2-225



A751

13. Install the primary driven shaft.

Fig. 2-226



A752

14. Apply High-Temp Sealant (p/n 0636-069) to both sides of the gear case gasket. Place the gasket against the crankcase.

Fig. 2-227



A753

15. Install the gear case cover with output shaft. Install the five screws; then tighten the screws with an impact screwdriver.

Fig. 2-228

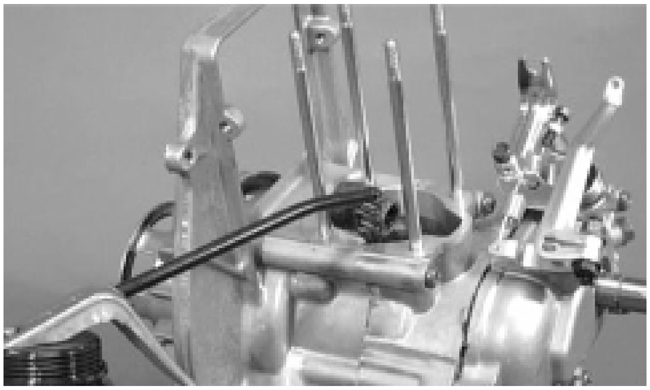


A755

CYLINDER HEAD/FAN

16. Place the bearing in the connecting rod small end. Apply Arctic Cat 50:1 Injection Oil to the bearing.

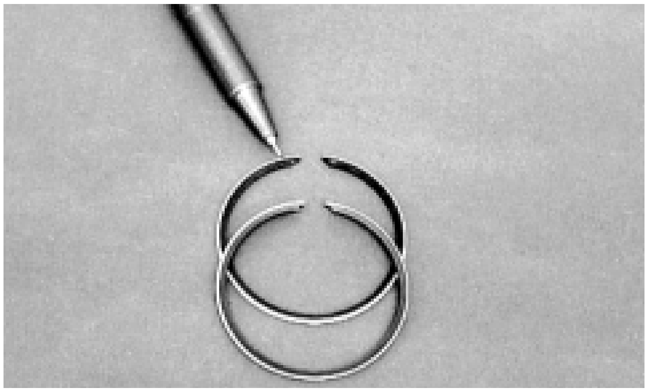
Fig. 2-229



A767

17. Install the piston rings. The letter near the ring end must be positioned upward. Make sure ring ends are positioned correctly over piston ring keepers.

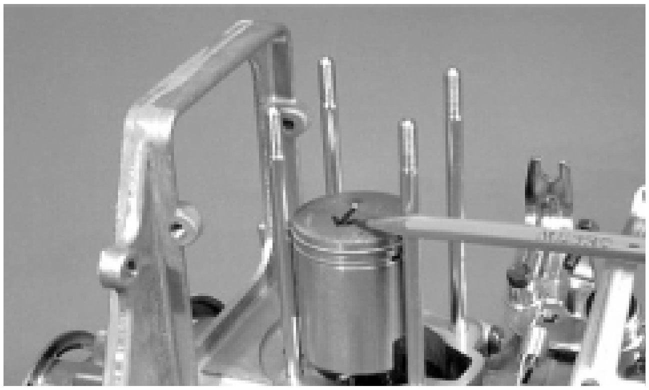
Fig. 2-230



A736

18. Place the piston assembly onto the connecting rod. Make sure the arrow on dome of the piston points to the exhaust side of the engine.

Fig. 2-231



A768

19. Install the piston pin. Secure the piston pin with circlips.

Fig. 2-232



A776

■ **NOTE: Make sure the open ends of the circlips are directed toward either the piston top or bottom.**

20. Apply a thin coat of high temperature sealant to both sides of the cylinder base gasket; then install the base gasket.

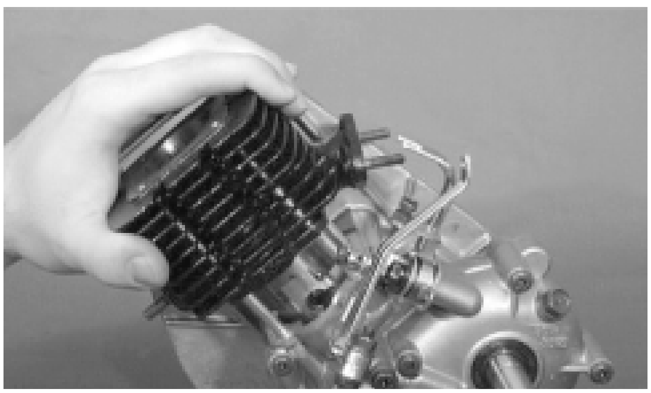
Fig. 2-233



A770

21. Using a piston holder to "square" the piston, compress the piston rings and install the cylinder. Do not force the cylinder. If cylinder binds, remove, check the position of the piston rings, and install.

Fig. 2-234



A771

22. Place the head gasket into position.

Fig. 2-235

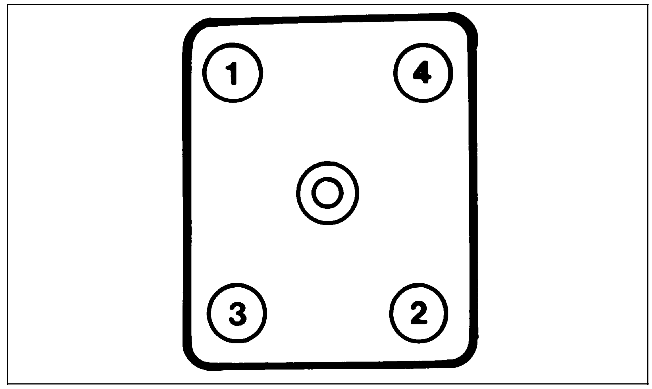


A772

23. Place the cylinder head into position. The head must be positioned so the cooling air flow is parallel to the fin pattern.

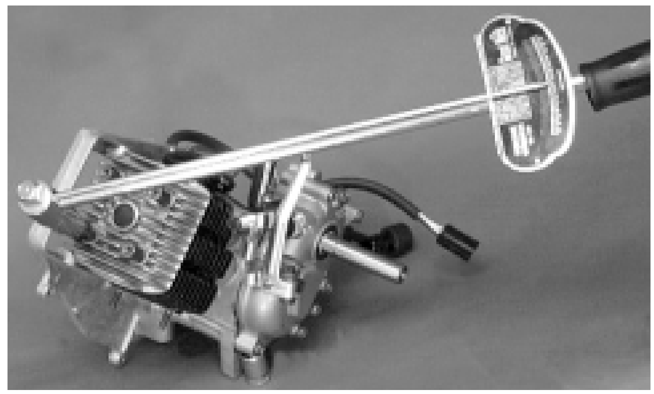
24. Tighten cylinder head nuts to 0.8-1.2 kg-m (6-9 ft-lb) using the pattern shown.

Fig. 2-236



725-318A

Fig. 2-237



A773

25. Place the ignition coil into position; then secure with two screws and lock washers. Connect the coil lead to the lead from the magneto.

Fig. 2-238



A757

26. When installing the stator plate, align the scribed marks made during disassembly. Apply red Loctite #271 to the three screws; then tighten the screws securely.

Fig. 2-239



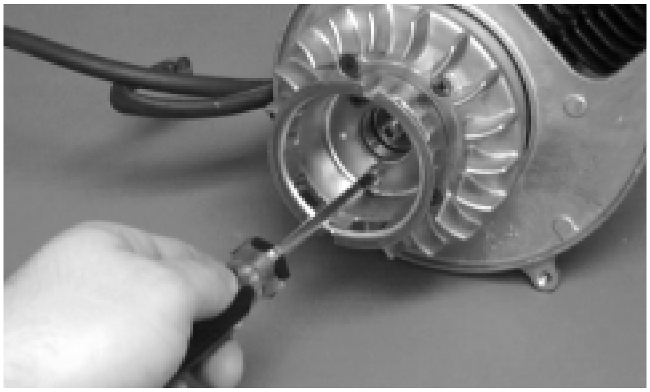
A765

27. Place flywheel key into position.

28. Make sure the flywheel magnets are clean; then align the keyway of the flywheel with the key in the crankshaft. Place the flywheel on crankshaft.

29. Install starter pulley and spacer. Secure with three screws and tighten securely.

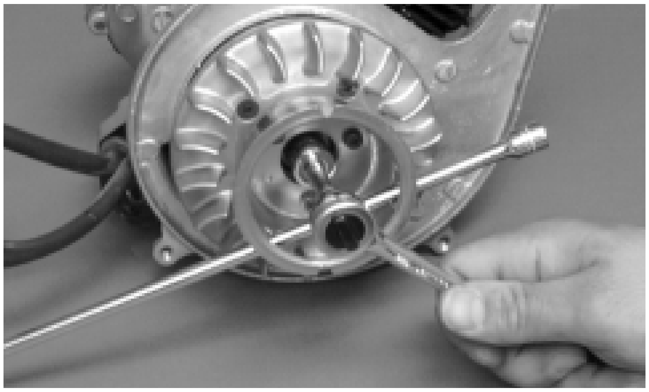
Fig. 2-240



A766

30. Install the flat washer, lock washer, and flywheel nut. Using a flywheel holder (or suitable substitute), tighten nut to 3-4 kg-m (22-29 ft-lb).

Fig. 2-241



A762

31. Install the cylinder head cowling and tighten securely.

Fig. 2-242



A774

32. Install the fan cover and secure with four screws. Make sure the high tension coil lead is secured by the upper rear screw.

Fig. 2-243



A775

33. Install recoil starter. Just before tightening the machine screws, pull the recoil rope and hold it to center the recoil; then tighten the screws securely.

■ **NOTE: Do not tighten the machine screw used to secure the lower fuel tank assembly mount at this time.**

Fig. 2-244



A788

2

34. Place the fuel tank assembly into position behind the loose recoil housing machine screw; then install the assembly to the cylinder head with two additional machine screws and lock washers. Tighten all recoil housing machine screws securely.

35. Install the exhaust gasket; then place the muffler onto the exhaust studs. Secure the muffler with two nuts and lock washers; then tighten nuts to 0.8-1.1 kg-m (6-8 ft-lb).

Fig. 2-245

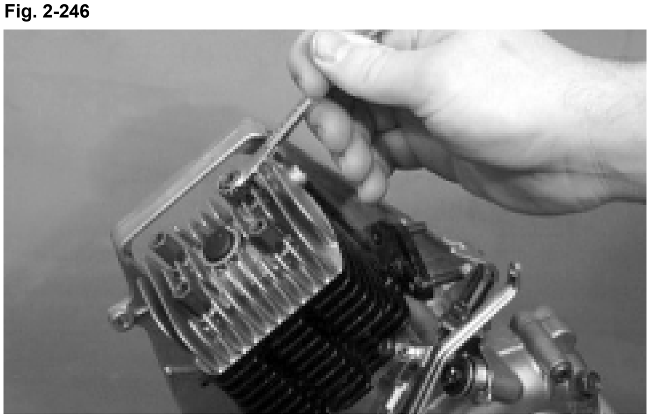


A778

36. Install the spark plug; then tighten to 2.5-2.8 kg-m (18-20 ft-lb).

37. In order, place a gasket, insulator, and gasket onto the intake studs.

Fig. 2-246

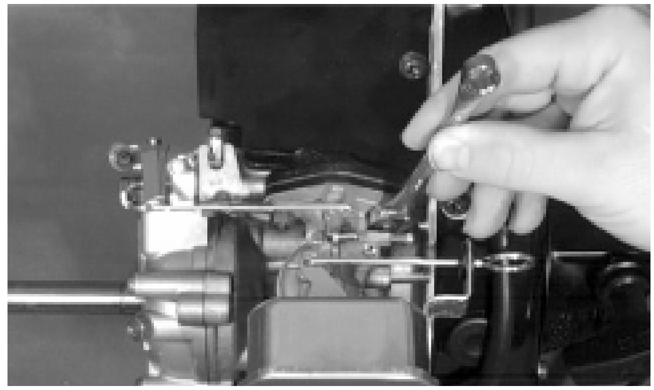


A777

38. Connect the carburetor rod and rod spring to the throttle control lever and the carburetor throttle plate.

39. Slide the carburetor onto the intake studs; then secure with two nuts and lock washers. Tighten nuts to 0.8-1.1 kg-m (6-8 ft-lb).

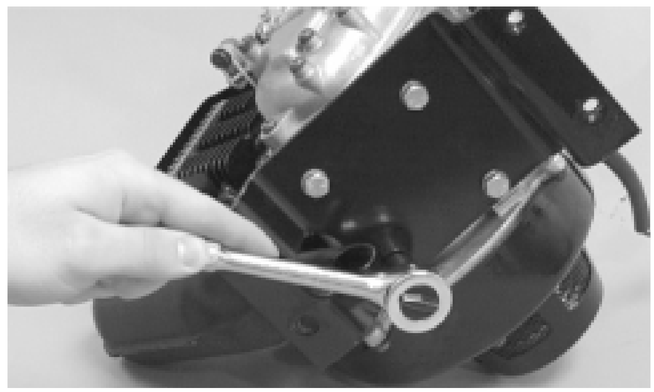
Fig. 2-247



A779

40. Place the engine onto the engine plate and secure with the four cap screws. Tighten to 4.2 kg-m (30 ft-lb).

Fig. 2-248



A900

Assembling Engine
(F/C Models)

■ **NOTE: The use of new gaskets and seals is recommended when assembling the engine.**

■ **NOTE: When the use of a lubricant is indicated, use Arctic Cat 50:1 Injection Oil.**

1. Install the C-ring and the five dowel pins into the lower crankcase half.

2. Lubricate the inner lips of the crankshaft oil seals with grease; then slide the seals onto the crankshaft making sure the spring side of each seal faces the center of the crankshaft.

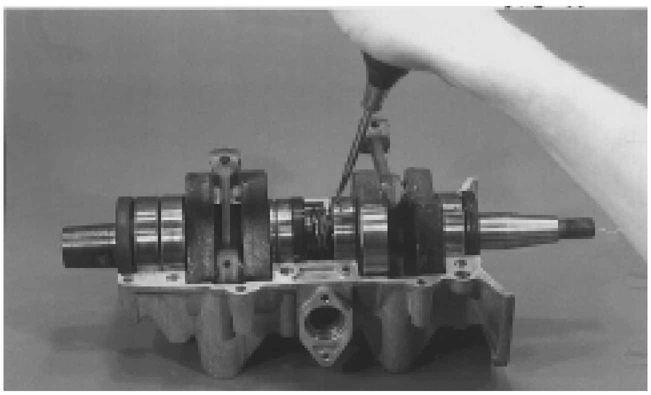
Fig. 2-249



AC087

3. Apply oil to the crankshaft bearings; then install the dowel pins, C-ring, and crankshaft into the lower crankcase half. Be sure the alignment hole in each bearing is positioned over its respective dowel pin in the crankcase; then seat the crankshaft.

Fig. 2-250



AB091

■ **NOTE: Make sure the crankshaft center seal is properly positioned in the groove of the lower crankcase half.**

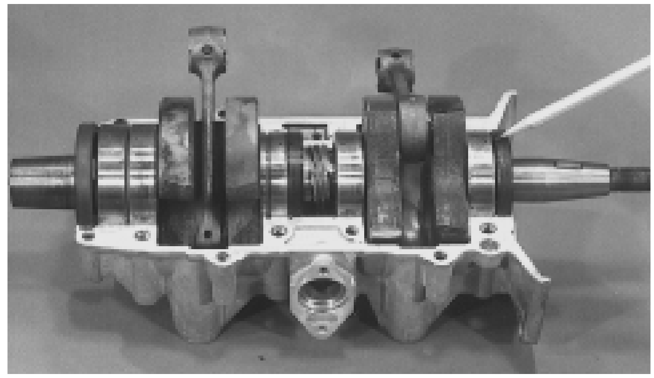
■ **NOTE: To check the bearing for proper position, place the point of a sharp tool into the dimple found in the bearing race. Strike the tool with the palm of the hand in either direction. If the bearing moves, it isn't positioned correctly and must be rotated until it drops onto the dowel pin.**

⚠ CAUTION
If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and engine damage will result.

4. Apply a thin coat of Three Bond Sealant (p/n 0636-070) to the crankcase sealing surfaces.

5. Assemble the crankcase halves making sure the crankcase alignment dowel pins are properly positioned and the end seal tab will not block the oil transfer port in the upper crankcase half.

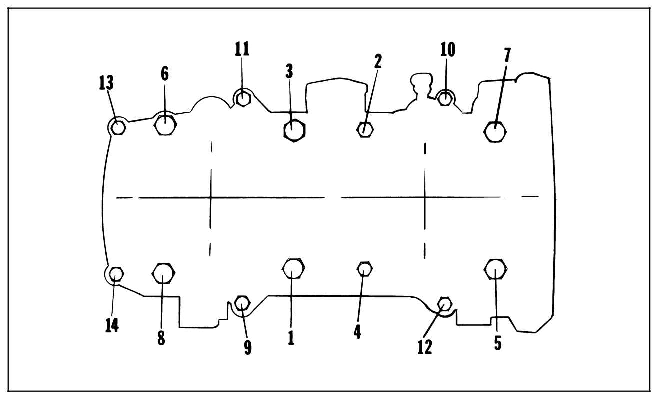
Fig. 2-251



AB092

6. Install the crankcase cap screws making sure the cap screws are in the corresponding-sized holes. Tighten in three steps the 8 mm cap screws to 1.8-2.8 kg-m (13-20 ft-lb) and the 6 mm cap screws to 0.8-1.2 kg-m (6-9 ft-lb) using the pattern shown.

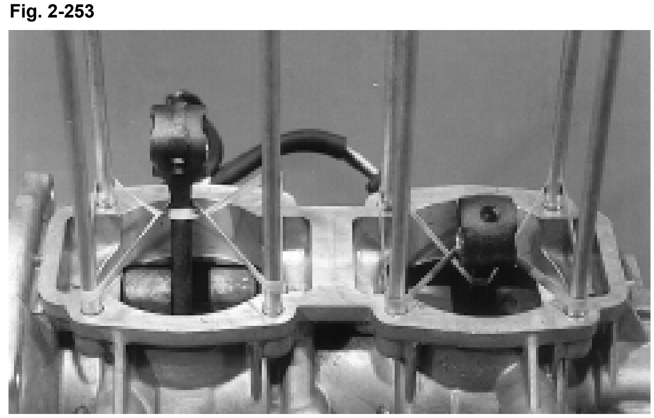
Fig. 2-252



0726-412

■ **NOTE: Secure the connecting rods with rubber bands on the cylinder studs.**

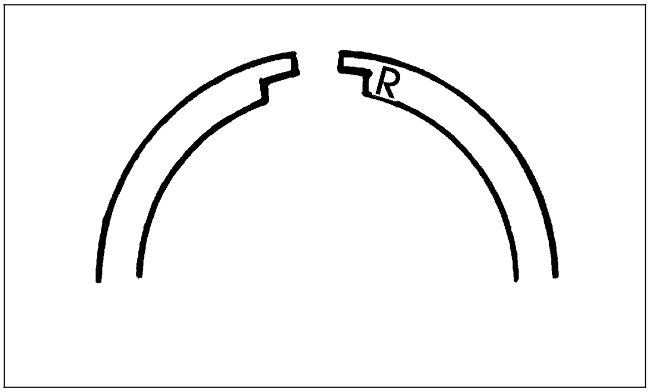
Fig. 2-253



B160

7. Install the piston rings on each piston so the letter on the top (inclined surface) of each ring faces the dome of the piston.

Fig. 2-254



726-306A

Fig. 2-255



AC088

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

8. Apply oil to the connecting-rod small-end bearings; then install the small-end bearings into the connecting rods.

■ **NOTE: Apply oil to the piston pin before installing.**

9. Place each piston over the connecting rod so the arrow on the piston dome points toward the exhaust port; then secure with a piston pin.

■ **NOTE: The arrow is found either up inside the piston or on the dome top.**

10. Install the new circlips so the open end is directed either down or up.

Fig. 2-256



B324D

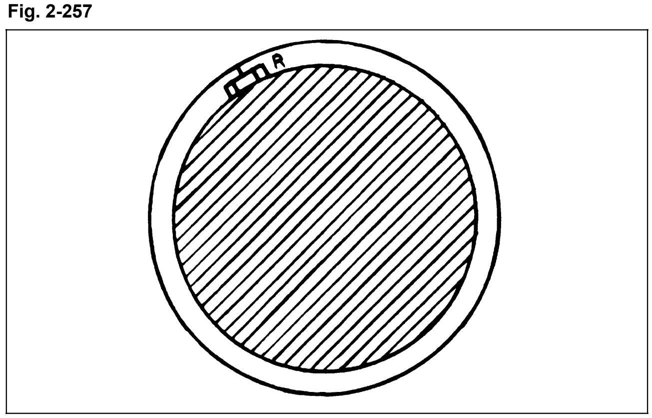
⚠ CAUTION

Make sure circlips are firmly seated and the open end is directed either down or up before continuing with assembly.

11. Install the cylinder base gaskets onto the crankcase making sure each gasket aligns with crankcase transfer passages.

12. Rotate each piston ring until the ring ends are properly positioned on each side of the ring keeper; then apply oil to the piston assemblies and cylinder bores. Remove the rubber bands from the connecting rods.

Fig. 2-257



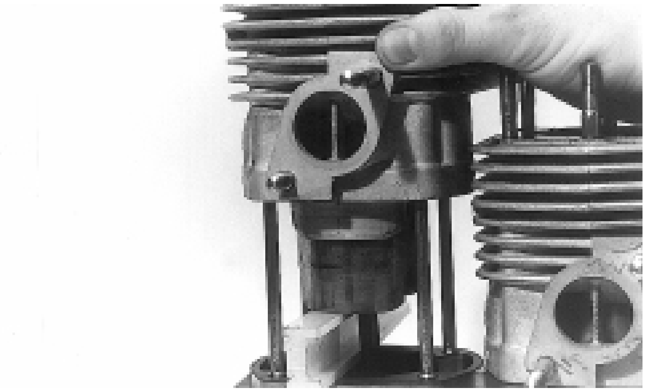
726-306B

■ **NOTE: Apply a generous amount of oil to the surfaces of the pistons, rings, and cylinder bores.**

■ **NOTE: Inspect the cylinder-base gasket to ensure proper positioning.**

13. For each piston, place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Remove the piston holder and seat the cylinder firmly onto the crankcase.

Fig. 2-258



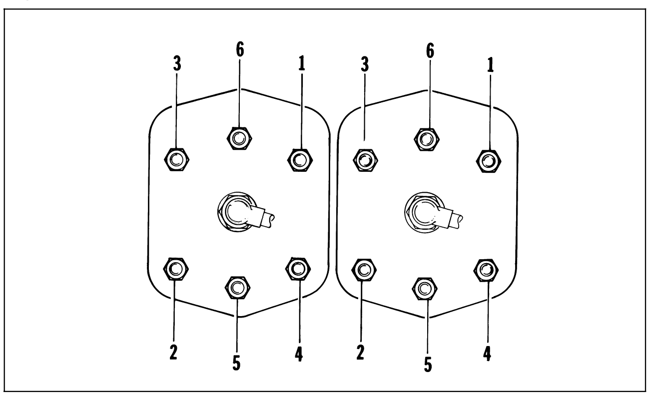
A828

14. Place each cylinder head with gasket into position and install the eight nuts. DO NOT TIGHTEN AT THIS TIME.

15. Temporarily install the exhaust manifold and secure with four nuts and lock washers to “square” the cylinders. Tighten the manifold nuts to 1.8-2.2 kg-m (13-16 ft-lb).

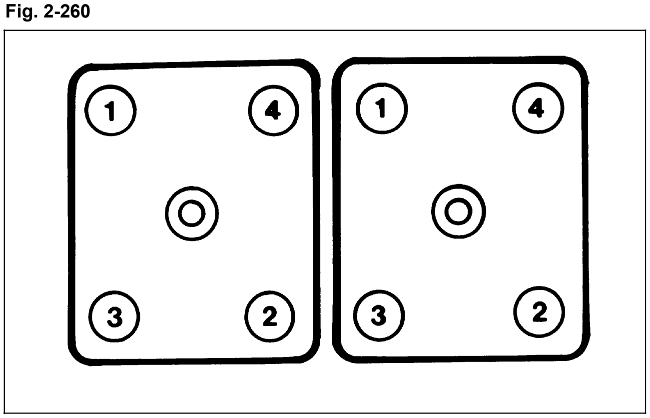
16. With the exhaust manifold in place, tighten the cylinder head nuts in three steps to 1.8-2.8 kg-m (13-20 ft-lb) using the appropriate pattern.

Fig. 2-259



0728-514

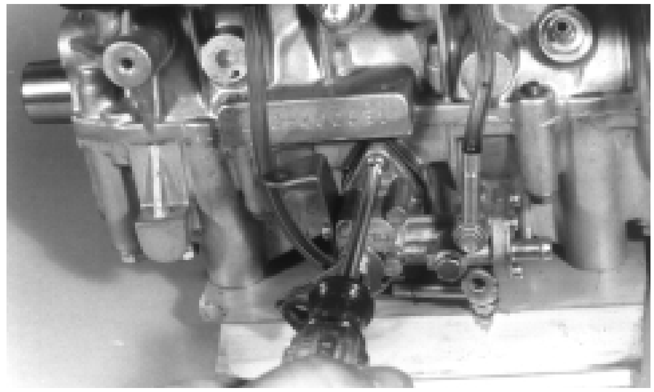
Fig. 2-260



0725-318

17. In order, install the gear, shim, gasket, retainer, gasket, and oil-injection pump. Secure with two screws, lock washers, and washers. Tighten to 0.7 kg-m (5 ft-lb).

Fig. 2-261



AB078

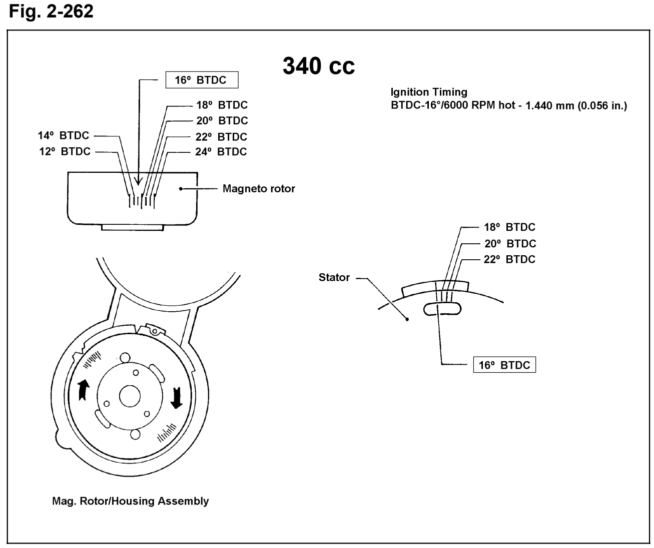
⚠ CAUTION

Be sure the gear is properly aligned with the slot of the oil-injection pump shaft. The injection pump will be damaged if these two components are not aligned.

■ **NOTE: If removed, secure the ignition coil to the fan case.**

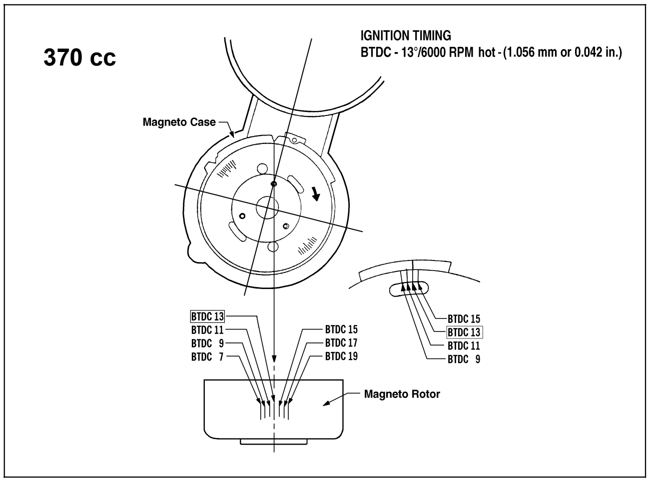
18. Align the reference marks made during disassembly; then secure the stator plate with two Allen-head cap screws (coated with red Loctite #271), lock washers, and washers.

Fig. 2-262



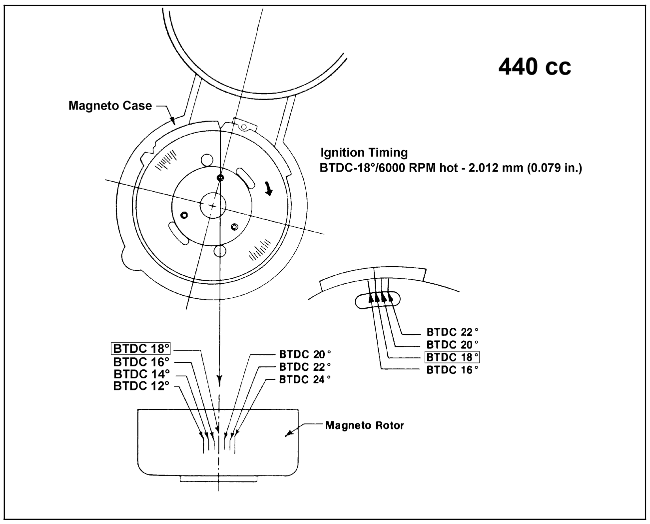
0729-651

Fig. 2-263



0734-489

Fig. 2-264



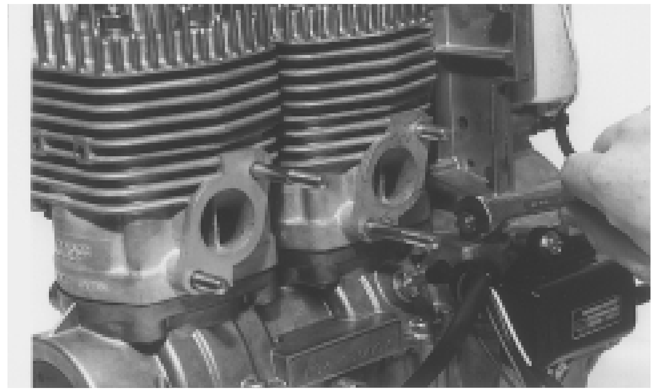
0726-863

■ NOTE: Before installing the flywheel, wipe the crankshaft and flywheel taper clean using a clean cloth.

19. Install the key in the crankshaft and slide the flywheel onto the crankshaft making sure the keyways match.

20. Place the fan case into position and secure with four nuts. Tighten the nuts to 1.8-2.2 kg-m (13-16 ft-lb).

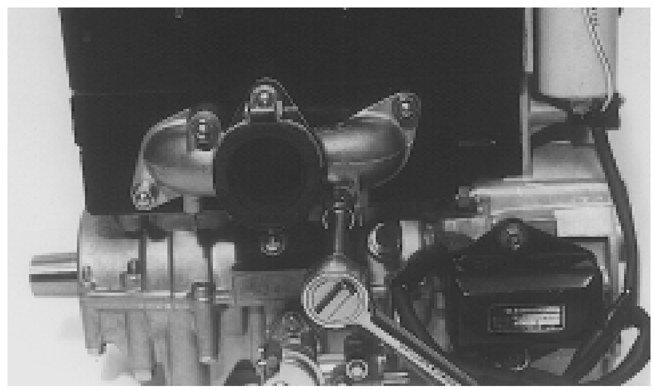
Fig. 2-265



A814

21. On the 340 cc, apply a thin coat of High-Temp Sealant (p/n 0636-069) to both sides of the intake gaskets; then in order, install a gasket (one on each port), shroud, gasket (one on each port), insulator block (one on each port), gasket (one on each port), and intake manifold. Secure with four nuts (threads coated with red Loctite #271). Tighten nuts in three steps to 1.8-2.2 kg-m (13-16 ft-lb).

Fig. 2-266



A808

22. On the 370 cc, apply a thin coat of High-Temp Sealant (p/n 0636-069) to both sides of the intake gaskets; then in order, install a gasket (one on each port), shroud, gasket (one on each port), and intake manifold. Secure with four nuts (threads coated with red Loctite #271). Tighten nuts in three steps to 1.8-2.2 kg-m (13-16 ft-lb).

23. On the 440 cc, apply a thin coat of High-Temp Sealant (p/n 0636-069) to both sides of the intake gaskets and the front side of each adapter plate; then in order, install a gasket (one on each port), shroud, gasket (one on each port), and adapter plate (one on each port). Secure with six screws coated with red Loctite #271. Place the intake flanges into position and secure with nuts, lock washers, and washers.

24. Remove the exhaust manifold.

25. Install spark plugs and tighten to 2.5-2.8 kg-m (18-20 ft-lb).

26. Attach the oil-injection hoses to their fittings. Secure with clamps.

Fig. 2-267



AB095

27. Test the engine for air leaks (see Section 3).

28. Temporarily secure the starter pulley on the flywheel with three cap screws. Install the flywheel washer, lock washer, and nut. Apply red Loctite #271 to the crankshaft threads before installing the flywheel nut. Using a spanner wrench to secure the crankshaft, tighten the flywheel nut to 7-9 kg-m (50.5-65 ft-lb).

Fig. 2-268



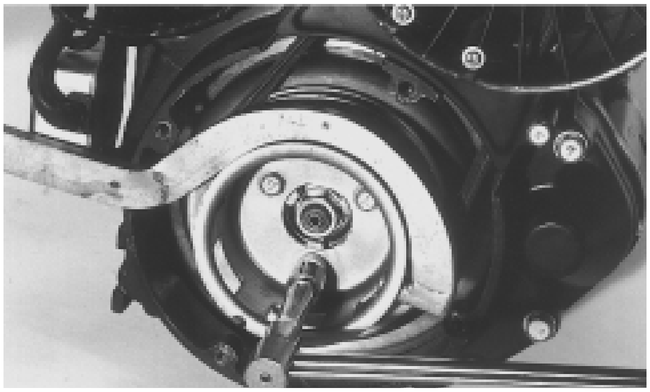
AB024

29. Remove the starter pulley. Position the fan belt drive pulley into the belt. Align the starter pulley holes with those in the belt pulley. Start one of the cap screws into the flywheel; then rotate the belt pulley and starter pulley in a counterclockwise direction.

30. When the pulley pivots on the cap screw, rock the pulleys backward or forward until the remaining cap screw holes align. Install the remaining two cap screws and tighten evenly to 0.8-1.2 kg-m (6-9 ft-lb).

■ **NOTE: Apply red Loctite #271 to the threads of the cap screws before installing.**

Fig. 2-269



AB040

31. Place an exhaust manifold gasket on each exhaust port making sure the metal side of the gasket faces the cylinder. Slide the exhaust-side cooling shroud onto the exhaust port studs; then place the upper cooling shroud into position and secure the shrouds with 14 cap screws noting the location of the longer cap screws from disassembling. Tighten to 0.4-0.7 kg-m (3-5 ft-lb). Connect the spark-plug caps.

Fig. 2-270



AB012

32. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the exhaust-manifold gasket; then place a gasket on each exhaust port making sure the metal side of each gasket faces away from the cylinder. Install the exhaust manifold, lock washers, and nuts and tighten to 1.8-2.2 kg-m (13-16 ft-lb).

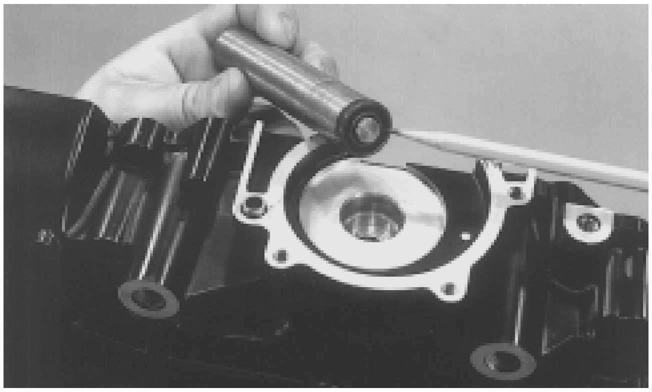
Assembling Engine (440 LC/550 cc Models)

■ **NOTE: Arctic Cat recommends the use of new gaskets and end seals when assembling the engine.**

1. Using the water pump bearing and seal driver, position the inner water pump shaft seal onto the seal driver and gently tap the seal down into position.

■ **NOTE: Apply grease to the lips of the inner seal before installation.**

Fig. 2-271



AN070

■ **NOTE:The seal must be installed with its spring side towards the crankshaft.**

2. Using a small screwdriver, apply a thin coat of grease to the inner seal lips.

3. Using a pair of snap ring pliers, install the snap ring securing the inner seal in the crankcase.

4. Using the seal driver, carefully install the outer water pump seal. Gently tap the seal down into position until it seats itself against its flange.

Fig. 2-272



AN072

5. Apply a thin coat of grease to the sealing surface of the oil-injection pump driveshaft; then place the Oil Seal Installation Tool (p/n 0644-219) at the end of the shaft. Twist the driveshaft clockwise as it is pushed through the oil and water pump seals; then remove the tool. Position the shim on the oil-injection pump end of the driveshaft.

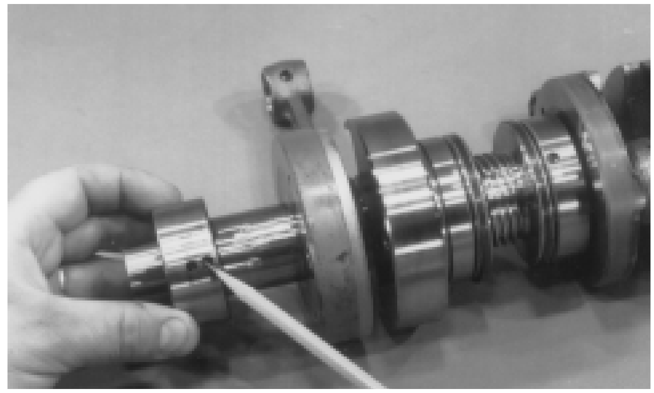
⚠ CAUTION
Be very careful not to damage the seals when installing the oil pump driveshaft. Be certain to use the seal installation tool. Twist the driveshaft clockwise as it enters the seal area and while it is being pushed through the seals.

6. Position the upper crankcase half upside-down on two wooden blocks; then install the C-ring and four dowel pins.

7. Place the PTO-side crankshaft bearing into position making sure the bearing dowel pin hole is positioned inward.

■ **NOTE: The dowel pin hole is the hole that doesn't go entirely through the bearing case.**

Fig. 2-273



AN078

8. Lubricate the inner lips of the crankshaft oil seals with grease; then slide the seals onto the crankshaft making sure the spring side of each seal faces the center of the crankshaft.

■ **NOTE: There is a MAG-side seal and a PTO-side seal.**

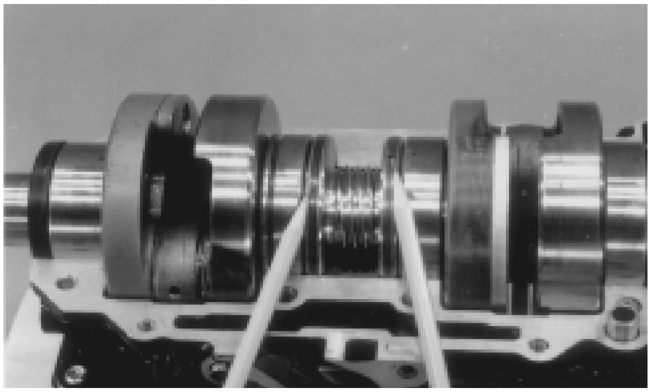
9. Apply oil to the crankshaft bearings; then install the crankshaft into the upper crankcase half. Be sure the alignment hole in each bearing is positioned over its respective dowel pin in the crankcase; then seat the crankshaft.

■ **NOTE: To check the bearing for proper position, place the point of a sharp tool into the dimple found in the bearing race. Strike the tool with the palm of the hand in either direction. If the bearing moves, it isn't positioned correctly and must be rotated until it drops onto the dowel pin.**

⚠ CAUTION
If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and engine damage will result.

10. Position the two center seal rings with their end gaps 180° apart (up on one and down on the other).

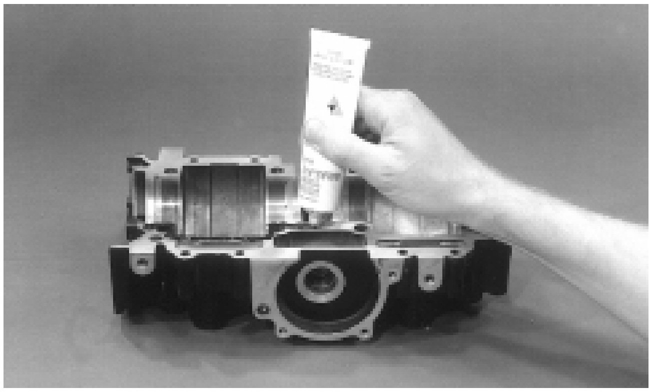
Fig. 2-274



AN083

11. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the bottom half of the entire crankcase sealing surface.

Fig. 2-275



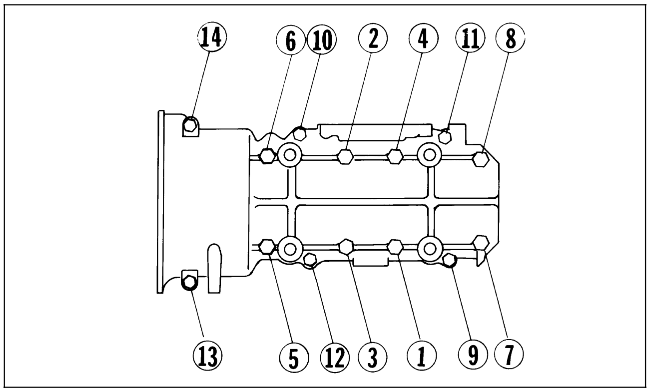
AQ127

■ **NOTE: Use only High-Temp Sealant (p/n 0636-069) to seal the crankcase halves.**

12. Assemble the crankcase halves making sure that the crankshaft gear and oil-injection pump driveshaft gears mesh. Rotate the crankshaft one full turn to align the crankshaft gear and pump driveshaft.

13. Install the 14 crankcase cap screws securing the crankcase halves making sure the cap screws are in the proper-sized holes. Tighten in three steps the 8 mm cap screws to 1.8-2.8 kg-m (13-20 ft-lb) and the 6 mm cap screws to 0.8-1.2 kg-m (6-9 ft-lb) using the pattern shown.

Fig. 2-276

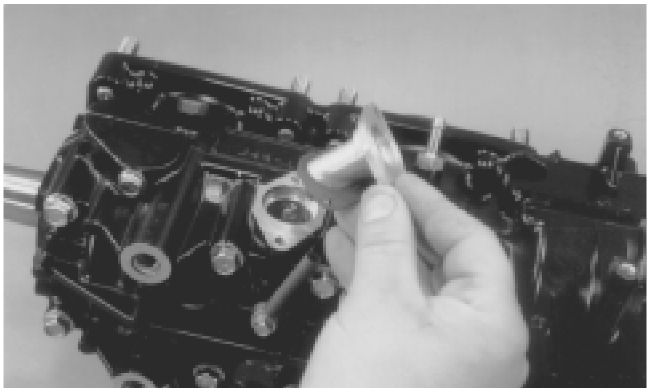


0728-137

■ **NOTE: Secure the connecting rods with rubber bands on the cylinder studs.**

14. Install the oil-injection pump retainer O-ring and retainer.

Fig. 2-277



AN088

15. Install the O-ring/gasket and the oil-injection pump making sure the pump shaft and pump align. Secure with two screws and washers. Tighten the two screws to 0.7 kg-m (5 ft-lb).

⚠ CAUTION

Be sure the driveshaft is properly aligned with the slot of the oil-injection pump. The pump will be damaged if these two components are not aligned.

16. Position the rubber seal retainer and seal into the back side of the water pump impeller.

■ **NOTE: The lined or marked side of the porcelain seal must face the rubber retainer.**

17. Using both thumbs, press the seal into position making sure its marked side is positioned towards the rubber seal cup.

18. Apply a thin coat of grease to the seal outer surface.

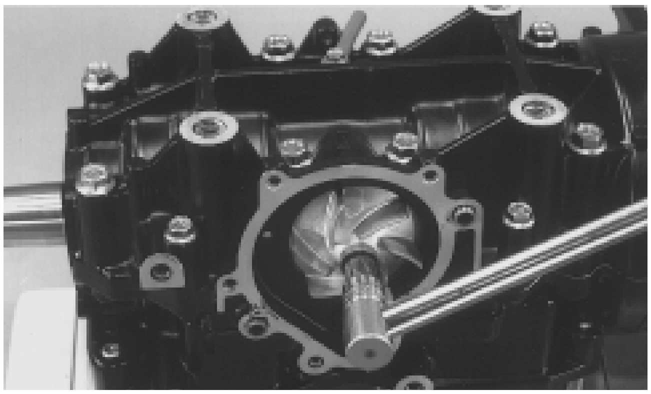
2

19. Place the impeller into position and secure with a cap screw and washer. Be sure the rubber side of the washer is directed toward the impeller. Apply blue Loctite #242 to the threads of the cap screw and tighten to 0.8-1.2 kg-m (6-9 ft-lb).

⚠ CAUTION

The rubber side of the washer (which secures the impeller) must be positioned toward the impeller. If installed incorrectly, a coolant leak will result.

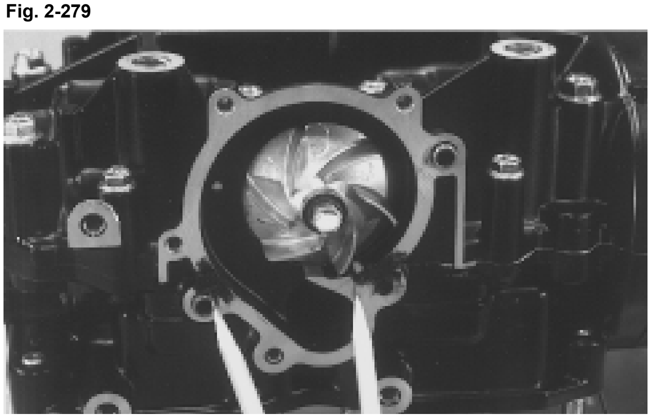
Fig. 2-278



AN094

20. Apply sealant to the crankcase seam; then install the alignment pins into the crankcase.

Fig. 2-279



AN095

■ **NOTE: Sealant is only required on the crankcase seam.**

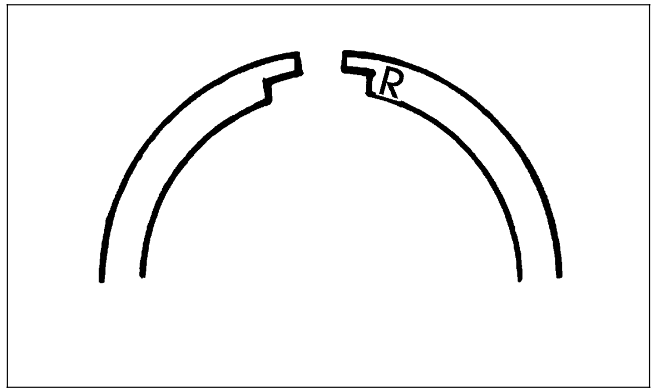
21. Position the O-ring into the water pump cover; then install the cover. Secure with five screws. Tighten securely.

22. Place the cylinder base gaskets into position on the crankcase.

■ **NOTE: Be sure to spray a thin coat of Copper Coat Gasket Sealant (p/n 0636-092) onto the gasket if it is being reused.**

23. Install the piston rings on each piston so the letter on the top (inclined surface) of each ring faces the dome of the piston.

Fig. 2-280



726-306A

⚠ CAUTION

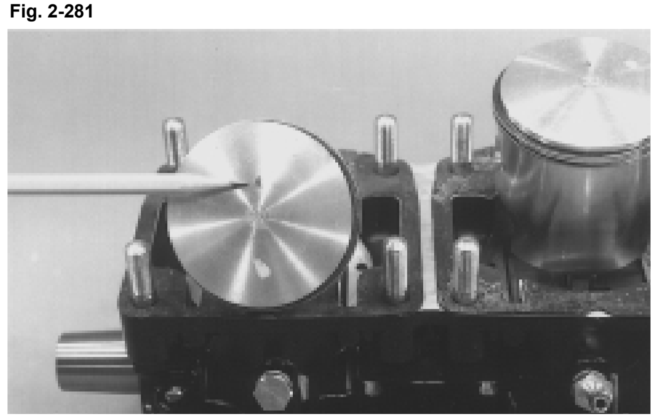
Incorrect installation of the piston rings will result in engine damage.

24. Apply oil to the connecting-rod small end bearings; then install the small-end bearings. Install a washer on each side of the connecting rod.

25. Place each piston over the connecting rod so the arrow on each piston will point toward the exhaust port; then secure with an oiled piston pin.

■ **NOTE: The arrow is found either up inside the piston or on the dome top.**

Fig. 2-281



AN101

26. Install the circlips so the open end is directed either up or down.

Fig. 2-282



AN102

> ⚠ **CAUTION**
>
> **Make sure the circlips are firmly seated and the open end is directed either up or down before continuing with assembly.**

27. Rotate each piston ring until the ring ends are properly positioned on either side of the ring keeper; then apply oil to the piston assemblies and cylinder bores. Remove the rubber bands from the connecting rods.

28. In turn on each cylinder, place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Remove the piston holder and seat the cylinder firmly onto the crankcase.

■ **NOTE: The cylinders should slide on easily. DO NOT force the cylinders on.**

Fig. 2-283

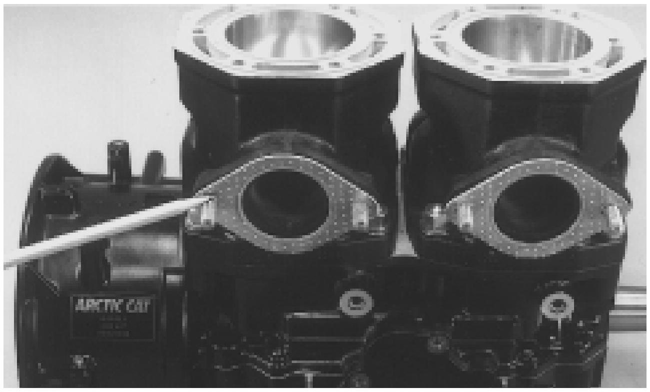


AN105

29. Secure each cylinder by installing the four nuts, washers, and lock washers. DO NOT TIGHTEN AT THIS TIME.

30. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to each exhaust port; then install the two exhaust gaskets with the metal sides facing out.

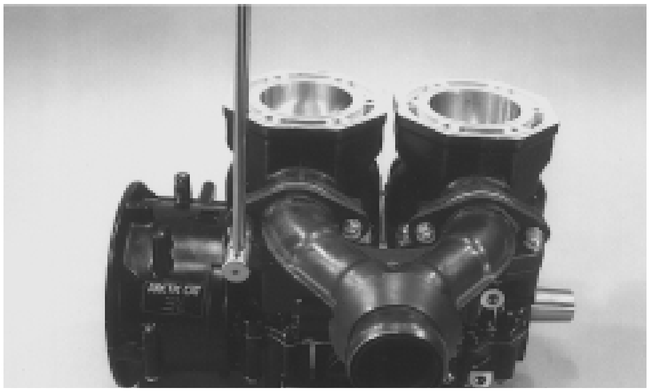
Fig. 2-284



AN106

31. Install the exhaust manifold and secure with four nuts and lock washers. Tighten the four nuts to 1.8-2.2 kg-m (13-16 ft-lb).

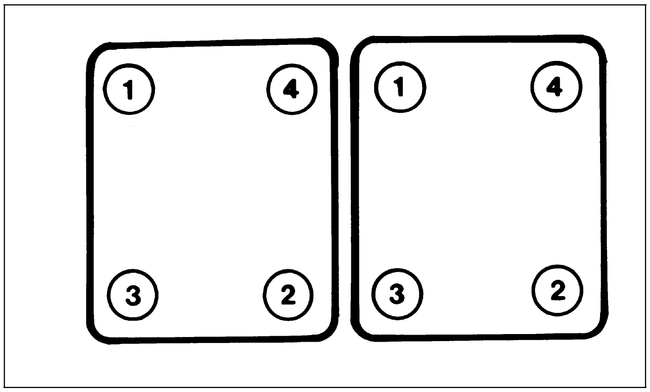
Fig. 2-285



AN107

32. With the exhaust manifold tightened, secure the cylinders by tightening the cylinder base nuts to 4-6 kg-m (29-43 ft-lb). Tighten the nuts in three steps using the pattern shown.

Fig. 2-286

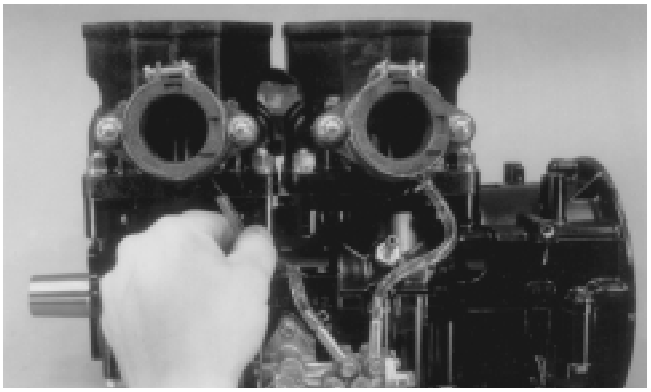


725-318B

33. Install the two oil-injection hoses and secure with the clamps.

2

Fig. 2-287



AN111

34. Install the two cylinder O-rings on the top of each cylinder making sure they are correctly positioned in the grooves.

Fig. 2-288



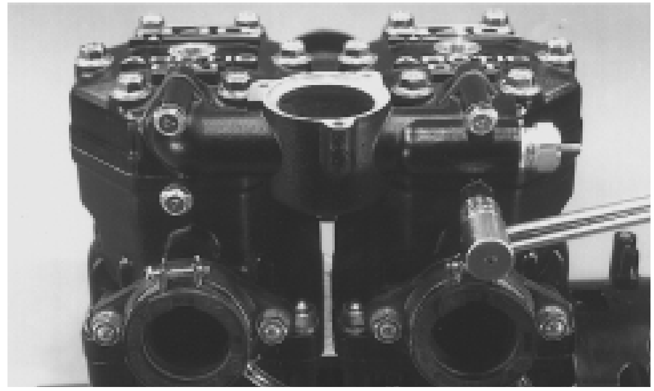
AN110

35. Place new O-rings onto each of the twelve head cap screws. Place four of these cap screws into one of the cylinder heads. Thread the spark plug in part way; then while holding the head above the cylinder, carefully start all four cap screws while observing the cylinder O-rings to make sure they remain in position. Slowly place the head into position on top of the O-rings. Start the remaining two cap screws being very careful not to move the cylinder head. Repeat the same procedure on the remaining head. ONLY FINGER-TIGHTEN AT THIS TIME.

36. Apply a thin coat of sealant to the two thermostat housing gaskets. Place the gaskets and housing into position and secure with four cap screws and washers. Tighten the four cap screws in a crisscross pattern to 0.7-1 kg-m (5-7 ft-lb).

■ **NOTE: The thermostat housing cap screws must be tightened before tightening the cap screws securing the head. This will allow the gasket surfaces of the head to align with the housing and prevent any coolant leakage.**

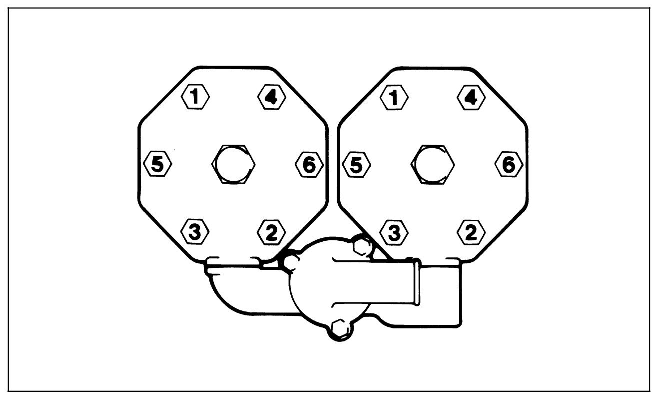
Fig. 2-289



AN113

37. Tighten the cap screws securing the head in three steps to 1.8-2.8 kg-m (13-20 ft-lb) using the pattern shown. Pressure test the engine (see Section 3).

Fig. 2-290



0728-138

38. Place the thermostat, gasket, and cap into position. Secure the cap with three cap screws tightened to 0.7-1 kg-m (5-7 ft-lb).

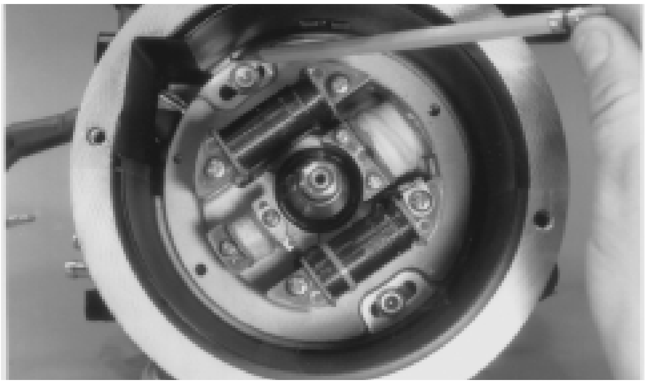
39. On the 550 cc, place the PTO-end plate into position on the crankcase; then apply blue Loctite #242 to the screws and tighten securely.

40. Place the stator plate into position over the crankshaft end.

41. Install the lock washers and washers on the Allen-head cap screws; then apply blue Loctite #242 to the threads of the stator plate Allen-head cap screws and install. DO NOT TIGHTEN AT THIS TIME.

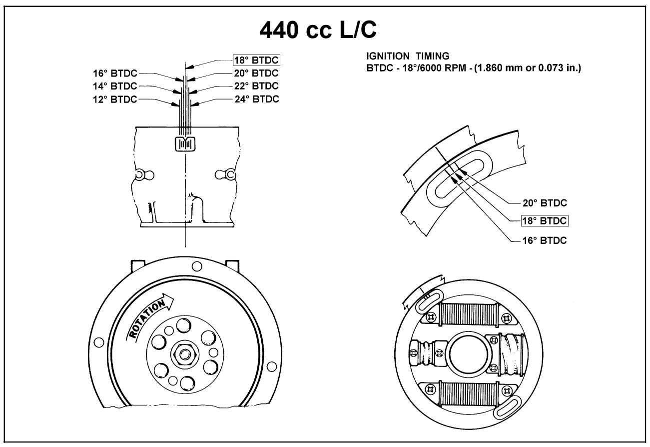
42. Align the stator plate with the alignment mark made during disassembly. Tighten both stator plate screws securely.

Fig. 2-291



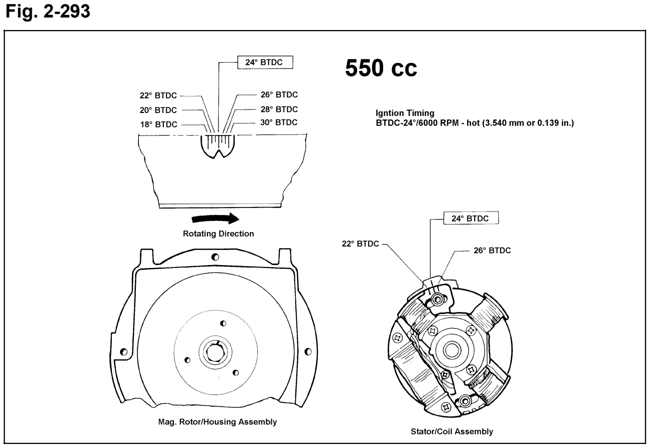
AN118

Fig. 2-292



728-165A

Fig. 2-293



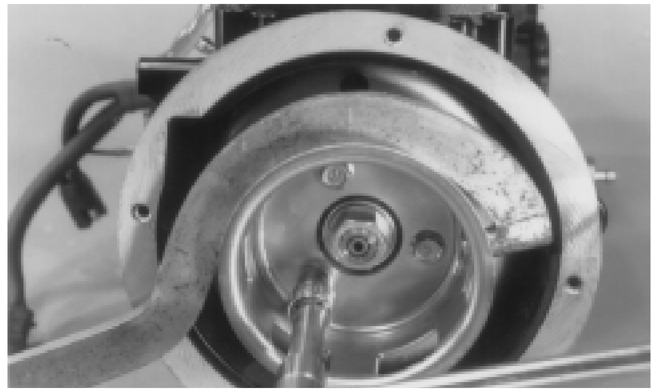
730-215C

■ **NOTE: Before installing the flywheel, be sure to wipe the crankshaft and flywheel tapers clean using a clean towel.**

43. Install the key in the crankshaft and slide the flywheel onto the crankshaft making sure the keyways match; then finger-tighten the flywheel nut with large flat washer and lock washer. Apply red Loctite #271 to the threads of the flywheel nut.

44. Install the starter pulley; then secure the starter pulley with three cap screws and lock washers. Secure the pulley while using the spanner wrench and tighten the three cap screws evenly to 0.7-1 kg-m (5-7 ft-lb).

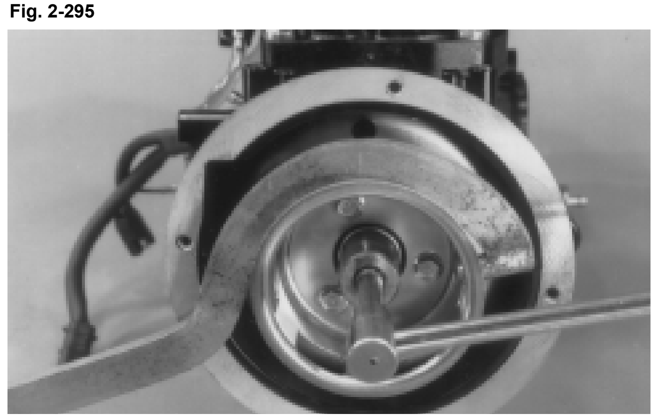
Fig. 2-294



AN121

45. Using the spanner wrench, tighten the flywheel nut to 7-9 kg-m (50.5-65 ft-lb).

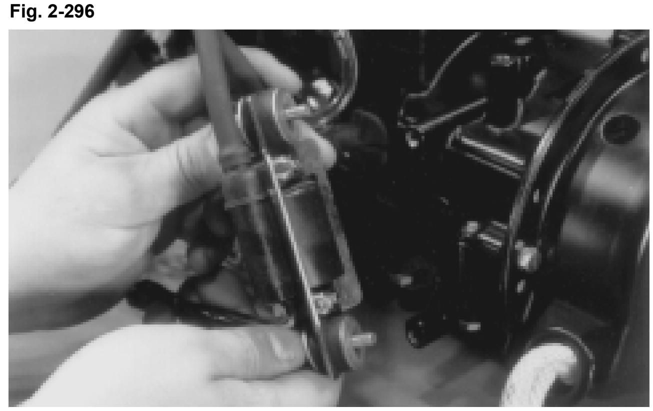
Fig. 2-295



AN122

46. On the 440 cc, place the CDI unit and external coil into position and secure with four cap screws and washers.

Fig. 2-296



AN124

47. Install the spark plugs and tighten to 2.5-2.8 kg-m (18-20 ft-lb). Connect the spark plug caps.

48. Place the engine mounting brackets into position on the crankcase and secure with the cap screws. Tighten the 440 cc to 2.4 kg-m (17 ft-lb). Tighten the 550 cc to 2.8-3.5 kg-m (20-25 ft-lb).

Assembling Engine (500/580/600 cc Twin Models)

■ **NOTE: Arctic Cat recommends the use of new gaskets and end seals when assembling the engine.**

1. Apply a thin coat of grease to the inner seal lips of the water pump seal.

2. Using the seal driver, position the inner water pump shaft seal onto the seal driver and gently tap the seal down into position.

■ **NOTE: Grease must be applied to the lips of the inner seal before installation.**

Fig. 2-297



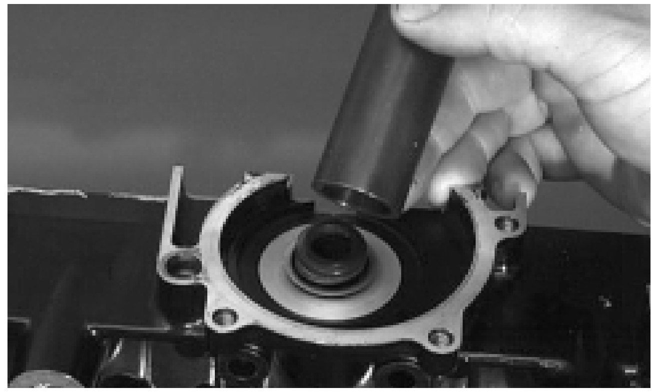
AN070D

■ **NOTE:The seal must be installed with its spring side towards the crankshaft.**

3. Install the snap ring securing the inner seal in the crankcase.

4. Using the seal driver, carefully install the outer water pump seal. Gently tap the seal down into position until it seats itself against its flange.

Fig. 2-298



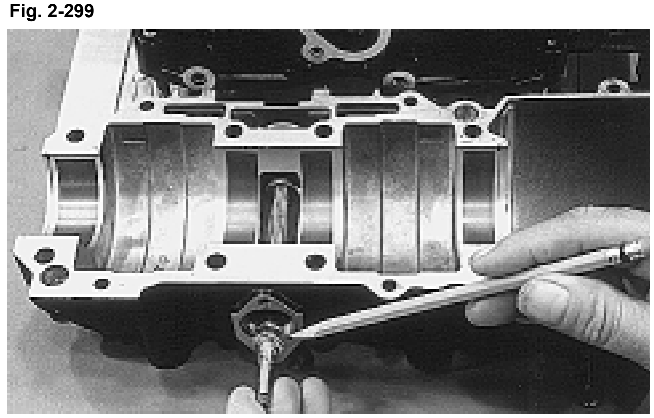
AN072D

5. Apply a thin coat of grease to the sealing surface of the oil-injection pump/water pump driveshaft; then place the Oil Seal Installation Tool (p/n 0644-219) at the end of the shaft. Twist the driveshaft clockwise as it is pushed through the oil and water pump seals; then remove the tool. Position the shim on the oil-injection pump end of the driveshaft.

⚠ CAUTION

Be very careful not to damage the seals when installing the oil pump driveshaft. Be certain to use the seal installation tool. Twist the driveshaft clockwise as it enters the seal area and while it is being pushed through the seals.

Fig. 2-299



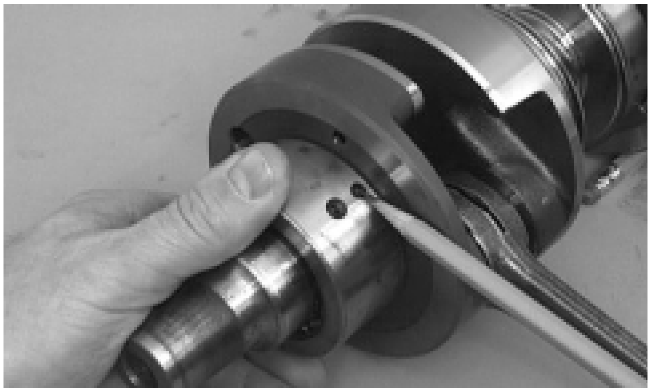
AN074

6. Position the upper crankcase half upside-down on two wooden blocks; then install the C-ring and four dowel pins.

7. Place the PTO-side crankshaft bearing into position making sure the bearing dowel pin hole is positioned inward.

■ **NOTE: The dowel pin hole is the hole that doesn’t go entirely through the bearing case.**

Fig. 2-300



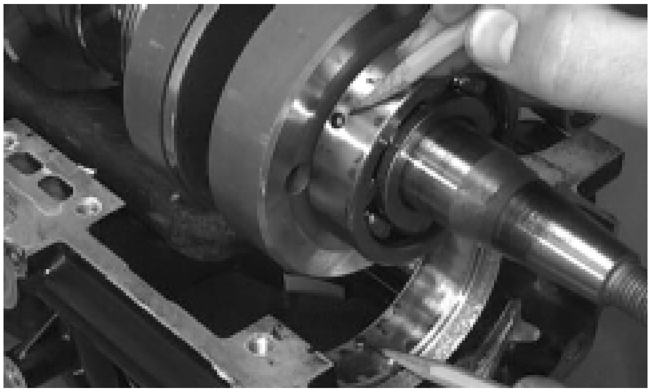
AN330D

8. Lubricate the inner lips of the crankshaft oil seals with grease; then slide the seals onto the crankshaft making sure the spring side of each seal faces the center of the crankshaft.

■ **NOTE: There is a MAG-side seal and a PTO-side seal.**

9. Apply oil to the crankshaft bearings; then install the crankshaft into the upper crankcase half. Be sure the alignment hole in each bearing is positioned over its respective dowel pin in the crankcase; then seat the crankshaft.

Fig. 2-301



AN331D

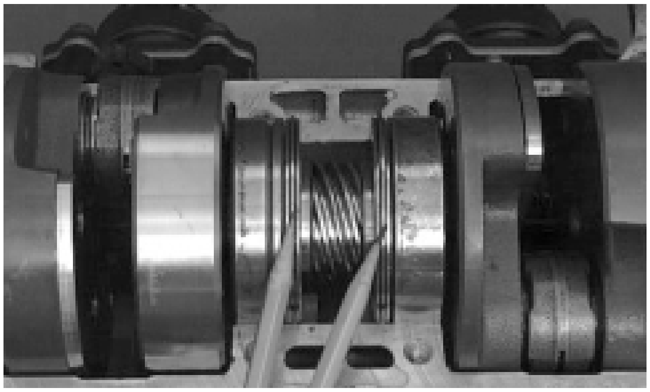
■ **NOTE: To check the bearing for proper position, place the point of a sharp tool into the dimple found in the bearing race. Strike the tool with the palm of the hand in either direction. If the bearing moves, it isn't positioned correctly and must be rotated until it drops onto the dowel pin.**

⚠ CAUTION

If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and severe engine damage will result.

10. Position the two center seal rings with their end gaps 180° apart (up on one and down on the other).

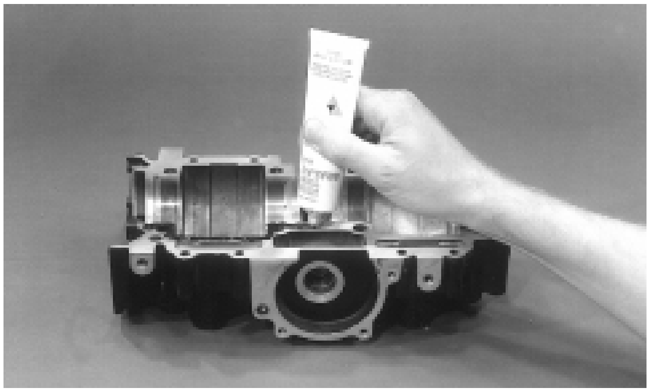
Fig. 2-302



AN083D

11. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the bottom half of the entire crankcase sealing surface.

Fig. 2-303



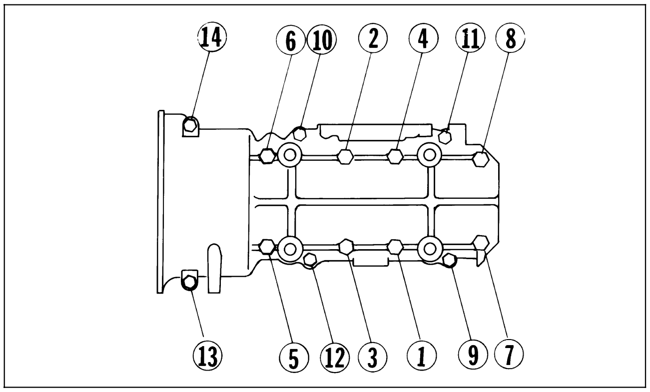
AQ127

■ **NOTE: Use only Arctic Cat High-Temp Sealant (p/n 0636-069) to seal the crankcase halves.**

12. Assemble the crankcase halves making sure that the crankshaft gear and oil-injection pump driveshaft gears mesh. Rotate the crankshaft one full turn to align the crankshaft gear and pump driveshaft.

13. On the 580 cc, install the 14 crankcase cap screws securing the crankcase halves making sure the cap screws are in the proper-sized holes. Tighten in three steps the 8 mm cap screws to 1.8-2.8 kg-m (13-20 ft-lb) using the pattern shown.

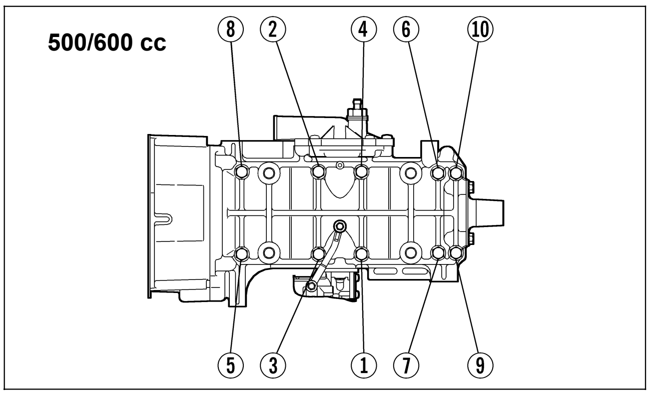
Fig. 2-304



0728-137

14. On the 500 cc/600 cc, install the crankcase cap screws (coated with blue Loctite #242) securing the crankcase halves. Tighten to 3-4 kg-m (22-29 ft-lb) using the pattern shown.

Fig. 2-305



0734-050

■ **NOTE: Secure the connecting rods with rubber bands on the cylinder studs.**

15. Install the oil-injection pump retainer O-ring and retainer.

Fig. 2-306



AN088D

16. Install the O-ring and the oil-injection pump making sure the pump shaft slot and pump driven gear shaft align. Secure with two screws (coated with blue Loctite #242) and washers. Tighten the two screws to 0.7 kg-m (5 ft-lb).

⚠ CAUTION

Be sure the oil-injection pump/water pump driveshaft is properly aligned with the slot of the oil-injection pump. The pump will be damaged if these two components are not aligned.

17. Position the rubber seal retainer and seal into the back side of the water pump impeller.

18. Using both thumbs, press the seal into position making sure its marked side is positioned towards the rubber seal cup; then apply a thin coat of grease to the seal outer surface.

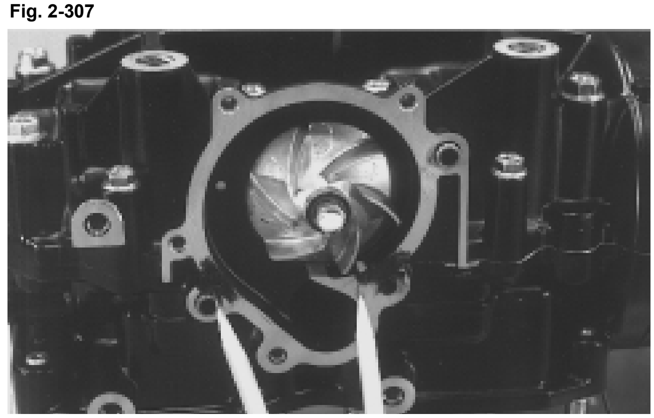
19. Place the impeller into position and secure with a cap screw and washer. Be sure the rubber side of the washer is directed toward the impeller. Apply blue Loctite #242 to the threads of the cap screw and tighten to 0.8-1.2 kg-m (6-9 ft-lb).

⚠ CAUTION

The rubber side of the washer, which secures the impeller, must be positioned toward the impeller. If installed incorrectly, a coolant leak will result.

20. Apply high-temperature sealant to the crankcase/water pump cover seam; then install the alignment pins into the crankcase.

Fig. 2-307



AN095

■ **NOTE: Sealant is only required on the crankcase seam.**

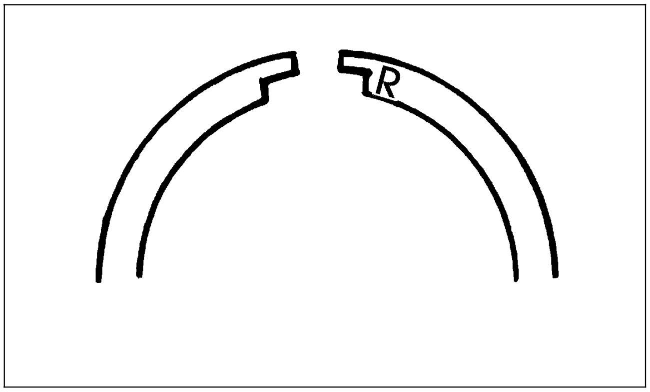
21. Position the O-ring into the water pump cover; then install the cover. Secure with five screws. Tighten to 1.1 kg-m (8 ft-lb).

22. On the 500 cc/600 cc, secure the intake manifolds, reed block assemblies, and gaskets with cap screws. Tighten to 1.1 kg-m (8 ft-lb).

23. Place the cylinder base gasket into position on the crankcase.

24. Install the piston rings on each piston so the letter on the top (inclined surface) of each ring faces the dome of the piston.

Fig. 2-308



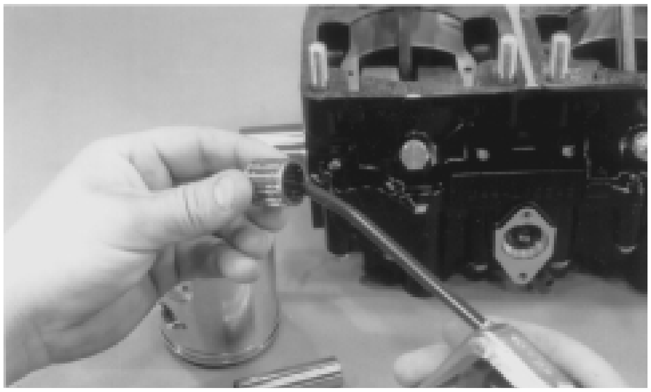
726-306A

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

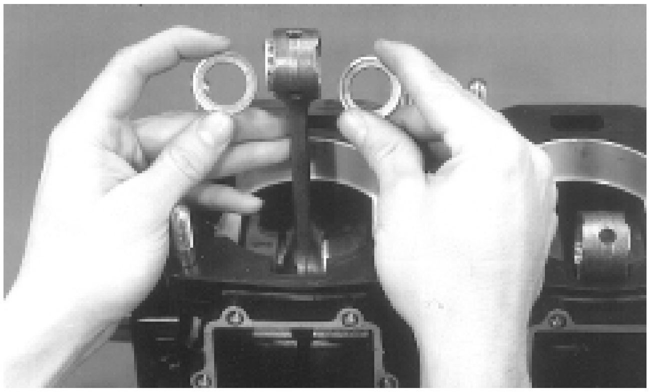
25. Apply oil to the connecting-rod small end bearings; then install the small-end bearings. Install a washer on each side of the connecting rod.

Fig. 2-309



AN100

Fig. 2-310

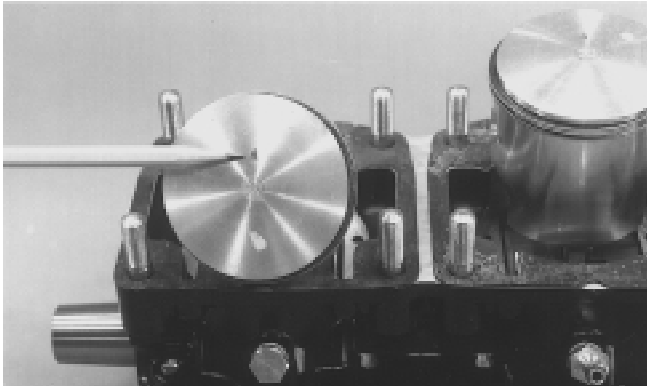


AQ059

26. Place each piston over the connecting rod so the arrow (or indicator dot) on each piston will point toward the exhaust port; then secure with an oiled piston pin.

■ **NOTE: The arrow (or indicator dot) is found either up inside the piston or on the dome top.**

Fig. 2-311



AN101

27. Install the new circlips so the open end is directed either up or down.

Fig. 2-312



B324D

⚠ CAUTION

Make sure the circlips are firmly seated and the open end is directed either up or down before continuing with assembly.

28. Rotate each piston ring until the ring ends are properly positioned on either side of the ring keeper; then apply oil to the piston assemblies and cylinder bores. Remove the rubber bands from the connecting rods.

29. In turn on each cylinder, place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Remove the piston holder and seat the cylinder firmly onto the crankcase.

■ **NOTE: The cylinders should slide on easily. DO NOT force the cylinders on.**

2

Fig. 2-313



AN105D

30. Secure each cylinder by installing the four nuts, washers, and lock washers. DO NOT TIGHTEN AT THIS TIME.

■ **NOTE: The cylinders will be tightened at the same time as the exhaust manifold is installed to assure proper cylinder to exhaust manifold alignment.**

31. Install the oil-injection hoses and secure with the clamps; then place the lower check-valve assembly into position and secure with the gaskets and union cap screw. Tighten securely.

32. Install the two cylinder O-rings on the top of each cylinder making sure they are correctly positioned in the grooves.

Fig. 2-314



AN110D

33. Place new O-rings onto each of the head cap screws. Place four of these cap screws into one of the heads (on the 580 cc) or into the cylinder head (on the 500 cc/600 cc). Thread the spark plugs in part way; then while holding the head above the cylinder, carefully start all four cap screws while observing the cylinder O-rings to make sure they remain in position. Slowly place the head into position on top of the O-rings. Start the remaining cap screws being very careful not to move the cylinder head. ONLY FINGER-TIGHTEN AT THIS TIME.

■ **NOTE: On the 580 cc, repeat the same procedure on the remaining head.**

34. On the 580 cc, apply a thin coat of sealant to the two thermostat housing gaskets. Place the gaskets and housing into position and secure with four cap screws and washers. Tighten the four cap screws in a crisscross pattern to 0.7-1 kg-m (5-7 ft-lb).

■ **NOTE: The thermostat housing cap screws must be tightened before tightening the cap screws securing the head. This will allow the gasket surfaces of the head to align with the housing and prevent any coolant leakage.**

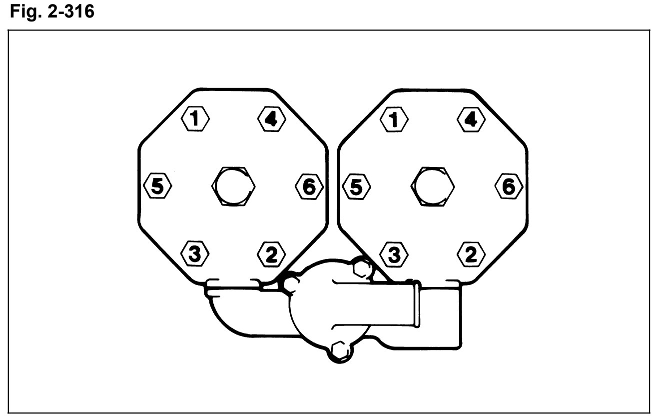
Fig. 2-315



AN146

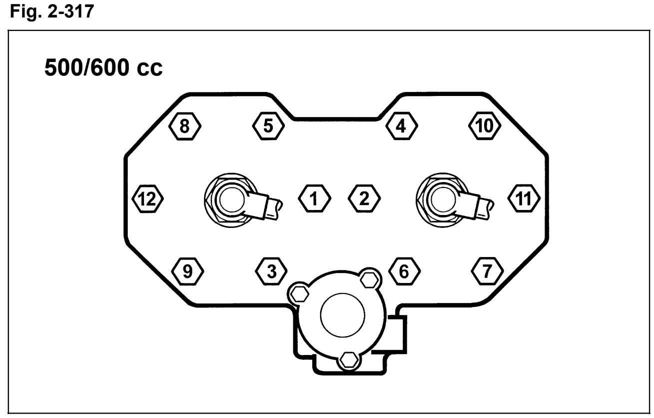
35. Tighten the cap screws securing the head in three steps to 1.8-2.8 kg-m (13-20 ft-lb) using the appropriate pattern shown.

Fig. 2-316



0728-138

Fig. 2-317



0733-524

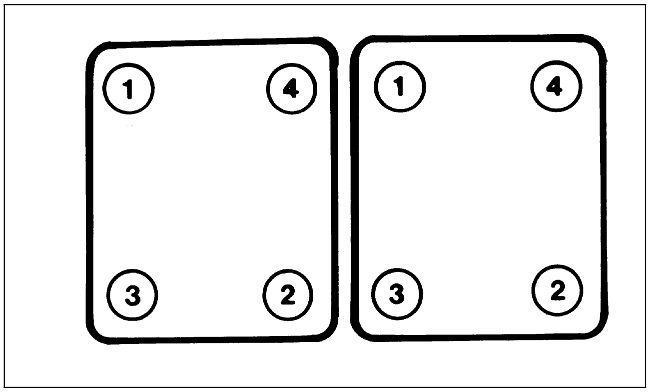
36. Place the thermostat, gasket, and cap into position. Secure the cap with three cap screws tightened to 0.7-1 kg-m (5-7 ft-lb).

37. Apply a thin coat of high-temperature silicone sealant to each exhaust port; then install the exhaust gaskets with the metal sides facing out.

38. Install the exhaust manifold and secure with four nuts and lock washers. Tighten the four nuts to 1.8-2.2 kg-m (13-16 ft-lb).

39. Tighten the spark plugs to 2.5 kg-m (18 ft-lb); then secure the cylinders by tightening the cylinder base nuts to 3-4 kg-m (22-29 ft-lb) in three steps using the pattern shown. Pressure test the engine (see Section 3).

Fig. 2-318



725-318B

40. On the 500 cc/600 cc, secure the ignition timing sensor with screws coated with blue Loctite #242.

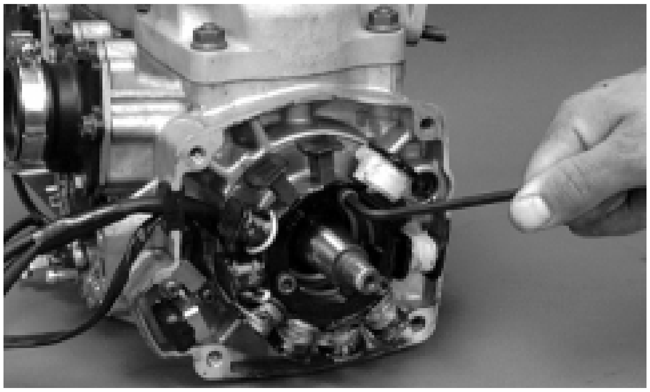
41. Place the PTO-end plate into position on the crankcase; then apply blue Loctite #242 to the four screws and tighten to 1.1 kg-m (8 ft-lb).

■ **NOTE: On the 580 cc, position the stator base over the crankshaft end; then route the wires through the magneto housing and install the grommet.**

42. On the 580 cc, secure the stator plate to the engine using the Allen-head cap screws coated with blue Loctite #242. Tighten to 1.1 kg-m (8 ft-lb).

43. On the 500 cc/600 cc, secure the stator to the stator plate with the Allen-head cap screws coated with blue Loctite #242; then install the stator wires with a grommet into the crankcase.

Fig. 2-319



AN413D

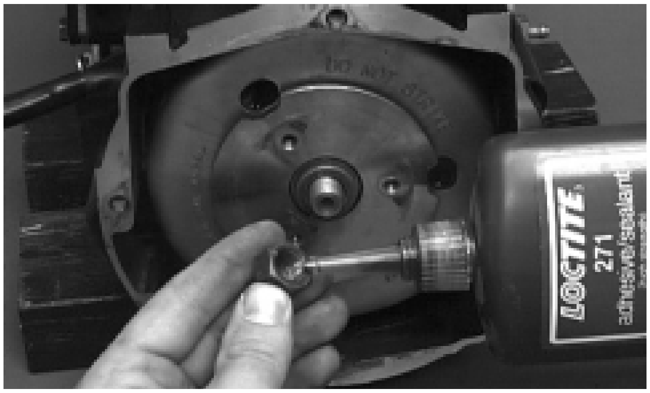
44. On the 500 cc/600 cc, secure the magneto case to the crankcase using the Allen-head cap screws coated with blue Loctite #242. Tighten to 2.5 kg-m (18 ft-lb).

45. Install the key in the crankshaft and slide the flywheel onto the crankshaft making sure the keyways match.

■ **NOTE: Before installing the flywheel, be sure to wipe the crankshaft and flywheel tapers clean using a clean towel.**

46. Apply red Loctite #271 to the threads of the flywheel nut; then finger-tighten with a large flat washer, lock washer, and the nut. DO NOT TIGHTEN AT THIS TIME.

Fig. 2-320

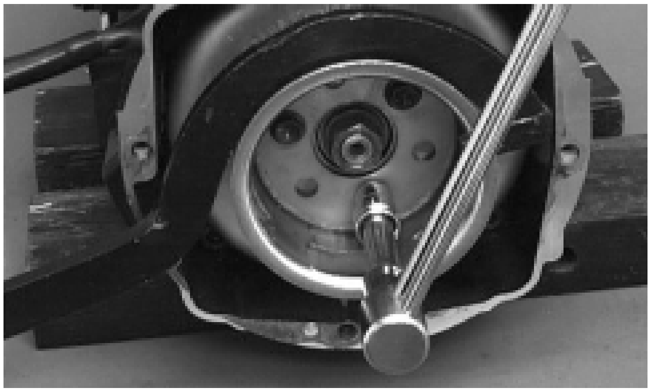


AN120D

47. Place the starter pulley in position; then loosely secure the starter pulley with three cap screws (coated with red Loctite #271) and lock washers. Secure the pulley while using the spanner wrench and tighten the three cap screws evenly to 0.7-1 kg-m (5-7 ft-lb).

2

Fig. 2-321



AN121D

48. Using the spanner wrench, tighten the flywheel nut to 7-9 kg-m (50.5-65 ft-lb).

■ **NOTE: On the 580 cc, place the ignition timing sensor into position and secure.**

49. Place the engine mounting brackets into position on the crankcase and secure with the cap screws. Tighten to 2.4 kg-m (17 ft-lb).

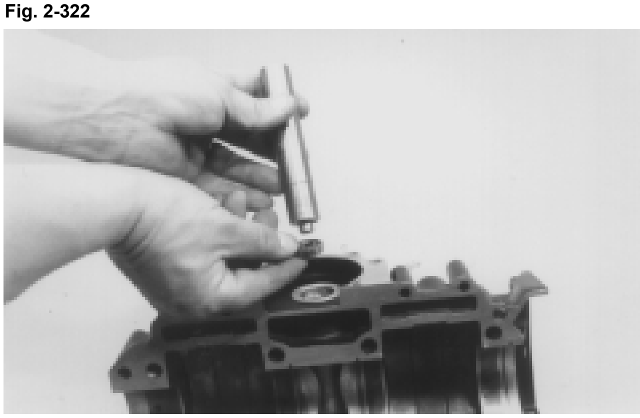
Assembling Engine
(700 cc Models)

■ **NOTE: Before starting engine assembly, all parts must be clean and all sealing surfaces free of any gasket sealant. Apply lightweight oil to all moving parts such as bearings, piston pin areas, piston skirts, piston rings, and the cylinder bores.**

■ **NOTE: Do steps 1-8 only if the water pump has been disassembled.**

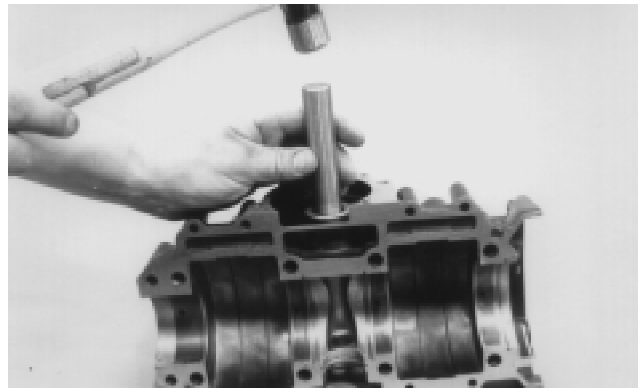
1. Using the Water Pump Bearing and Seal Kit (p/n 0644-084) and a hammer, place the water pump shaft bearing down into the bore and drive it into position. Seat the bearing against the rear shoulder of the bore.

Fig. 2-322



AJ148

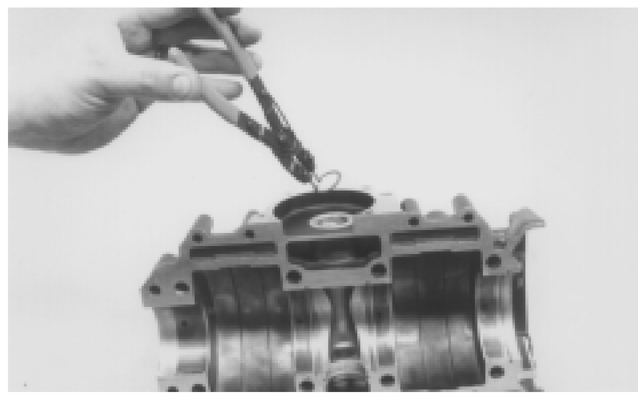
Fig. 2-323



AJ149

2. Using a pair of snap ring pliers, install the snap ring which secures the water pump shaft bearing. Make sure the snap ring is seated firmly in the snap ring groove with the sharp side out.

Fig. 2-324



AJ150

3. Apply grease to the inner lips of the small water pump shaft seal and position the seal in the crankcase bore with the spring side of the seal facing toward the bearing. Make sure the small spring located around the lip of the seal is properly positioned.

Fig. 2-325



AJ151

⚠ CAUTION

When positioning the seal on the driver, check to make sure the small spring is still in position around the lip of the seal.

4. Using the seal driver, gently tap the seal down into position against the snap ring. Check the seal after the first couple of taps to make sure it is started straight.

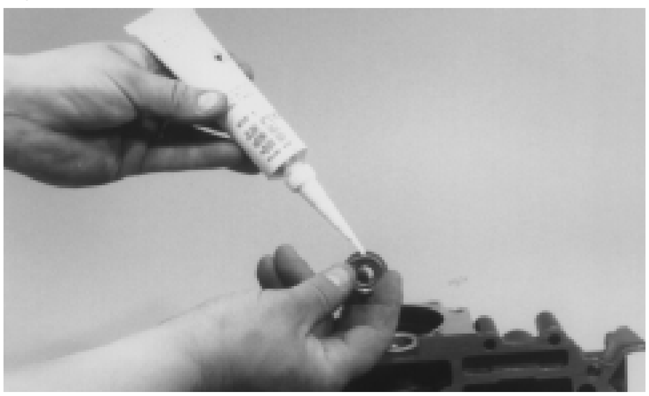
Fig. 2-326



AJ152

■ **NOTE: Sealant may already be on the metal case; however, if no sealant is apparent, apply a thin, even coat of High-Temp Sealant (p/n 0636-069) to the outer metal case of the water pump seal.**

Fig. 2-327



AJ153

5. Using the water pump seal driver, gently drive the seal into position in the crankcase bore. The seal is properly seated when its metal flange is tight against the crankcase.

Fig. 2-328



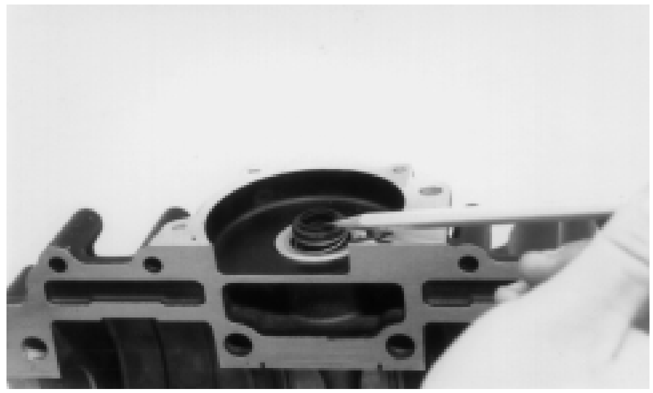
AJ154

6. Wipe any excess sealant from the crankcase after the seal is properly seated.

⚠ CAUTION

After the seal has been installed, closely examine the seal surface to make sure it hasn't been damaged.

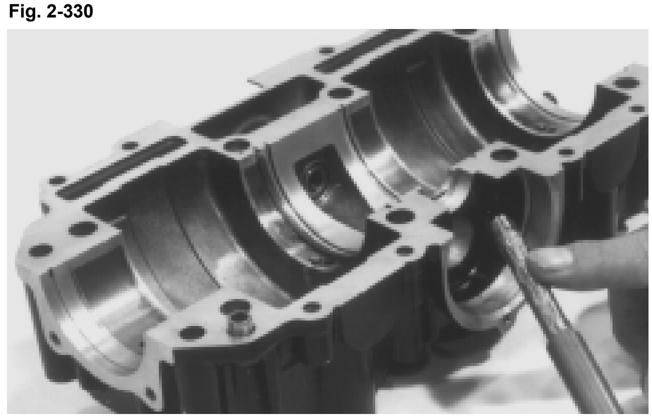
Fig. 2-329



AJ155

7. Apply a light coat of grease to the smooth, machined portion of the water pump shaft; then while slowly rotating the shaft as it enters the bearing and seal area, gently push the shaft into position.

Fig. 2-330



AJ090

⚠ CAUTION

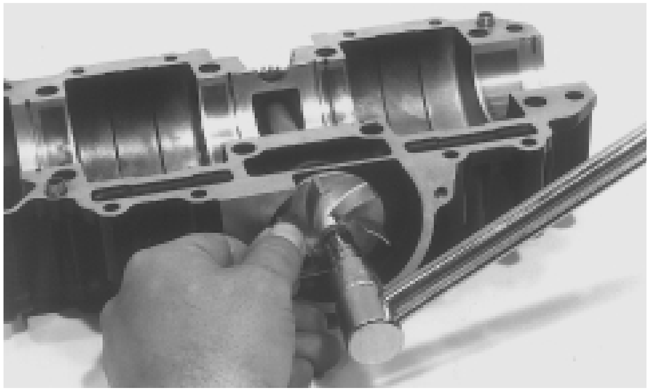
Care must be taken when installing the water pump shaft or the small spring could be forced out of its position on the inner seal. Slowly push the well-greased shaft through the inner seal while slowly rotating the shaft clockwise as it enters the seal.

8. Apply a coat of grease to the impeller sealing area on the back side of the impeller; then install the water pump impeller onto the shaft. Apply red Loctite #271 to the impeller bolt threads and tighten to 0.8 - 1.0 kg-m (6-7 ft-lb).

2

■ **NOTE: When installing the washer on the impeller bolt, the rubber side must face the impeller. If installed incorrectly, coolant will leak from the crankcase bleed hole.**

Fig. 2-331

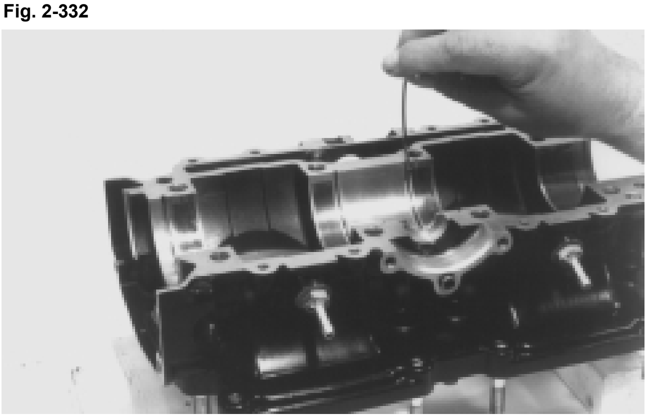


AJ091

9. Set the top half of the crankcase upside down on the work bench with a 4 in. block of wood under each end.

10. Install the two C-rings (one for locating the pinion bearing and the other to locate the crankshaft assembly) in the upper crankcase half. Install the four crankshaft bearing dowel pins in the crankcase bearing areas.

Fig. 2-332



AJ095

11. Using Arctic Cat 50:1 Injection Oil, lubricate the PTO bearing and slide it onto the crankshaft.

⚠ CAUTION

The bearing oil hole must be positioned toward the outer end of the crankcase.

12. Lubricate the inner lips of the crankshaft oil seals with grease; then slide the seals onto the crankshaft making sure the spring side of each seal faces the center of the crankcase.

■ **NOTE: There is a MAG-side seal and a PTO-side seal.**

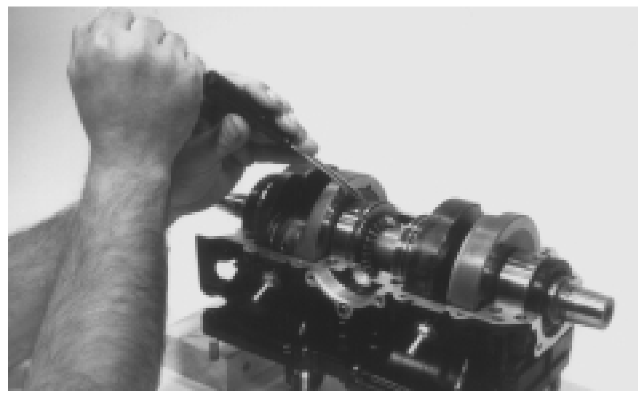
13. Apply Arctic Cat 50:1 Injection Oil to all of the crankshaft bearings; then install the crankshaft into the upper crankcase half. Be sure the alignment hole in each bearing is positioned over its respective dowel pin in the crankcase.

■ **NOTE: Check all bearings by trying to rotate them to make sure they are being held in position by the dowel pin. Each bearing must drop onto the dowel pin. If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and engine damage will result.**

⚠ CAUTION

If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and severe engine damage will result.

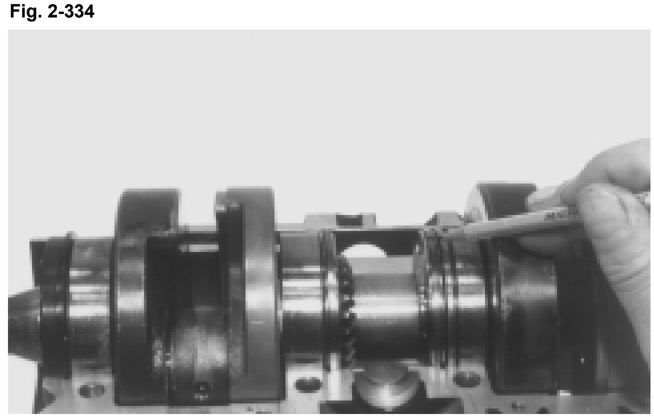
Fig. 2-333



AJ097

14. Rotate the crankshaft center seal rings so the end gaps of the two large rings are 180° apart, one end gap being positioned downward and the other upward; then seat the crankshaft.

Fig. 2-334

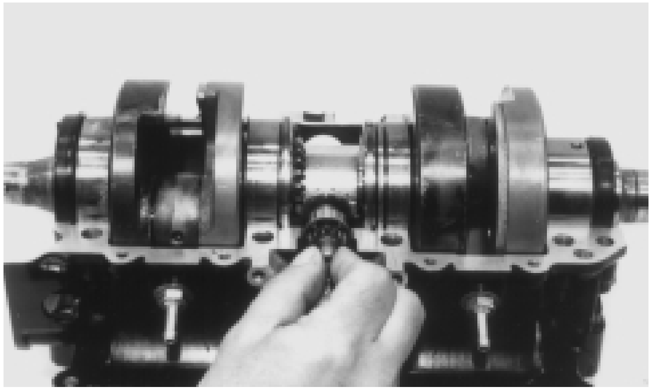


AJ098

■ **NOTE: If a new pinion gear or crankshaft was installed, see Shimming Pinion Gear in this sub-section. Otherwise, proceed to step 15.**

15. Install the shim washer(s) on the pinion shaft and set the pinion assembly into position in the top half of the crankcase. Be sure the pinion bearing is seated over its C-ring. Lubricate both the pinion and crankshaft gears using a generous amount of Arctic Cat 50:1 Injection Oil.

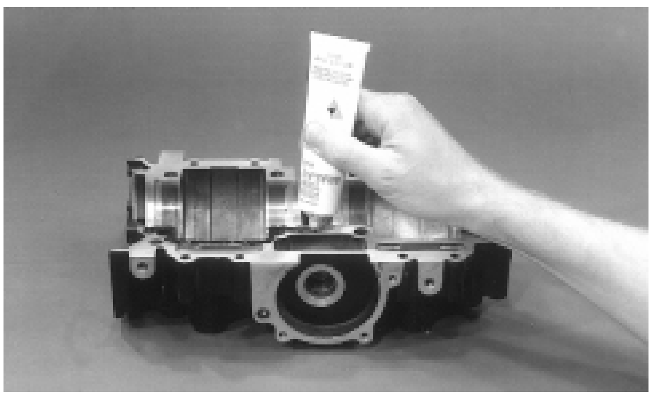
Fig. 2-335



AJ099

16. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the lower crankcase sealing surfaces.

Fig. 2-336



AQ127

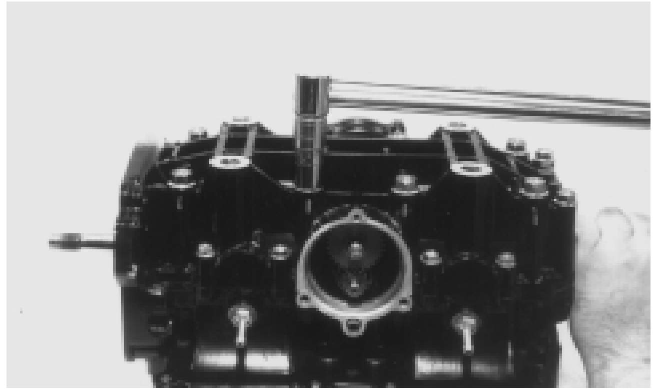
⚠ CAUTION

Check to make sure the two crankcase half locating dowel pins are in position at opposite corners of the lower case half.

17. Assemble the crankcase halves making sure that the pinion gear and water pump gear mesh properly.

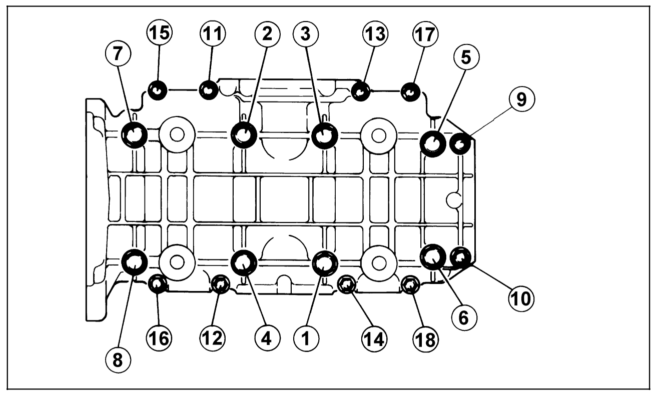
18. Install the 18 crankcase cap screws securing the crankcase halves making sure the proper-sized cap screws are in the proper holes. Tighten in three steps the 10 mm cap screw to 4.0 - 6.0 kg-m (29-43 ft-lb), 8 mm cap screws to 1.8 - 2.9 kg-m (13-20 ft-lb), and the 6 mm cap screws to 0.8 - 1.2 kg-m (6-9 ft-lb) using the pattern shown.

Fig. 2-337



AJ101

Fig. 2-338

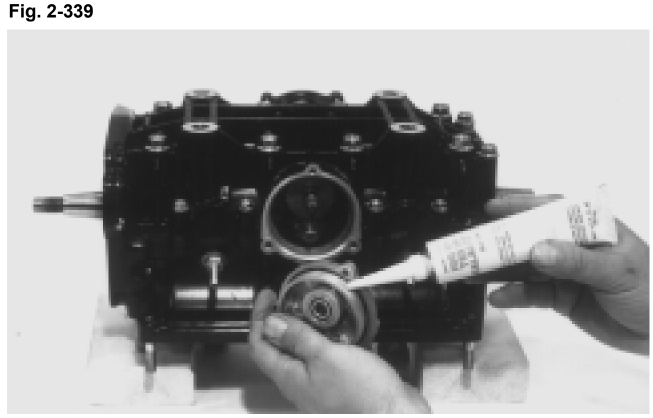


0727-491

■ **NOTE: Secure the connecting rods with rubber bands on the cylinder studs.**

19. Install the O-ring on the oil-injection pump retainer. Apply a thin coat of silicone sealant over the top of the O-ring. Apply a small amount of Arctic Cat 50:1 Injection Oil to each of the bearings in the retainer and rotate them by hand to spread the oil.

Fig. 2-339

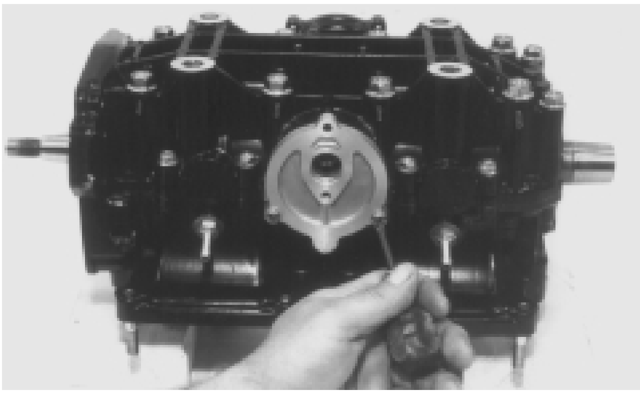


AJ105

■ **NOTE: Before installing the oil-injection pump retainer, check the pinion gear backlash (see Shimming Pinion Gear in this sub-section).**

20. Install the oil-injection pump retainer taking care to align the pinion and water pump shafts with their respective bearings. Press the retainer onto its dowel pin located in the top half of the crankcase. Install the screws and tighten to 0.8 - 1.2 kg-m (6-9 ft-lb). Tighten the screws evenly.

Fig. 2-340



AJ106

21. Place the end plate into position on the crankcase; then apply blue Loctite #242 to the four screws and tighten securely.

Fig. 2-341



AJ103

⚠ CAUTION

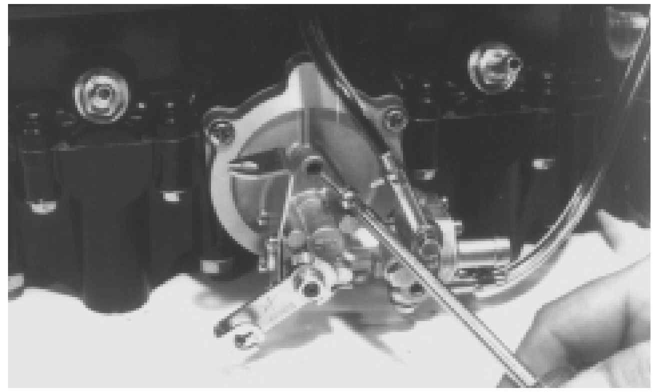
Make sure the slot of the oil-injection pump shaft is aligned with the shaft in the crankcase before installing the two oil pump mounting screws. If not aligned, the oil pump mounting flange will crack when the screws are tightened.

22. Apply a thin coat of silicone sealant to both sides of the oil pump gasket. Install the gasket and oil-injection pump. Secure with two screws and washers. Tighten the two screws to 0.7 kg-m (5 ft-lb).

⚠ CAUTION

The shorter screw must be installed in the top mounting hole of the oil pump or bearing damage will result.

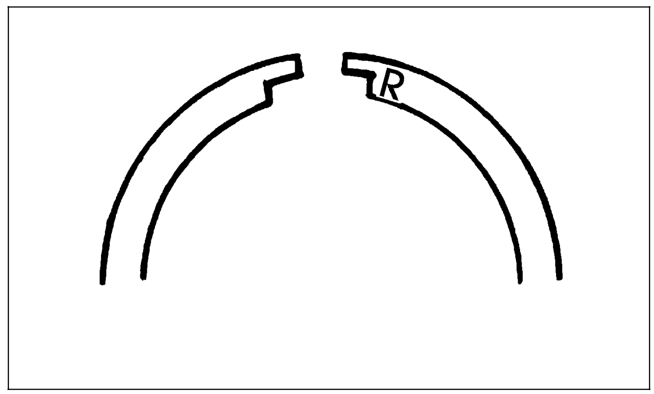
Fig. 2-342



AJ107

23. Install the piston rings on each piston so the letter on the top or inclined surface of each ring faces the dome of the piston.

Fig. 2-343



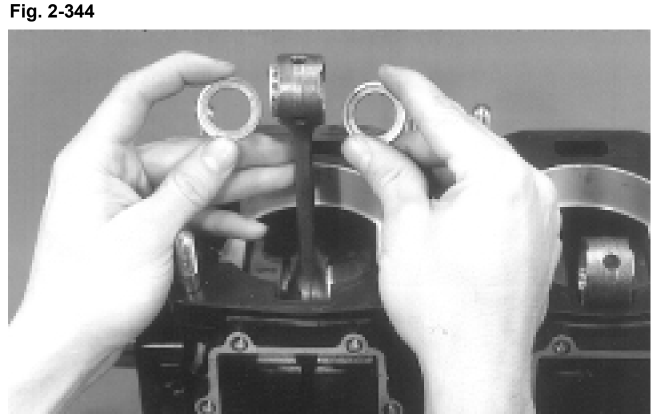
726-306A

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

24. Apply oil to the connecting-rod small end bearings; then install the small-end bearings and thrust washers.

Fig. 2-344



AQ059

25. Place each piston over the connecting rod so the arrow on each piston will point toward the exhaust port; then secure with a piston pin.

Fig. 2-345



AJ109

■ **NOTE: The arrow is found up inside the piston.**

26. Install the new circlips so the open end is directed either down or up.

Fig. 2-346

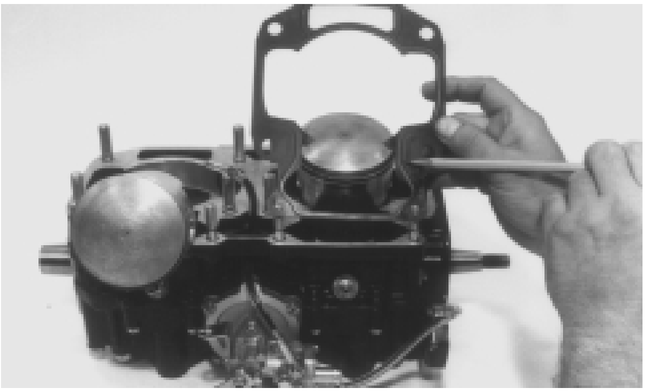


AJ110

> ⚠ **CAUTION**
>
> **Make sure circlips are firmly seated and the open end is directed either down or up before continuing with assembly.**

27. Apply a thin coat of Copper Coat Gasket Sealant (p/n 0636-092) to both sides of each cylinder-base gasket if the gaskets are being reused. If using new gaskets, it isn't necessary to apply copper coat. Install the gasket with the raised portion of the gasket positioned upward.

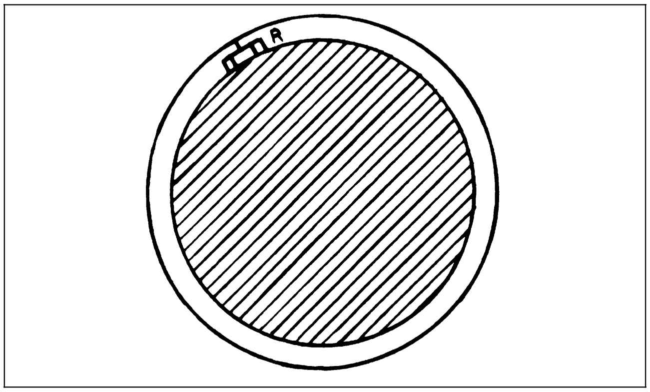
Fig. 2-347



AJ111

28. Rotate each piston ring until the ring ends are properly positioned on either side of the ring keeper; then apply oil to the piston assemblies and cylinder bores. Remove the rubber bands from the connecting rods.

Fig. 2-348

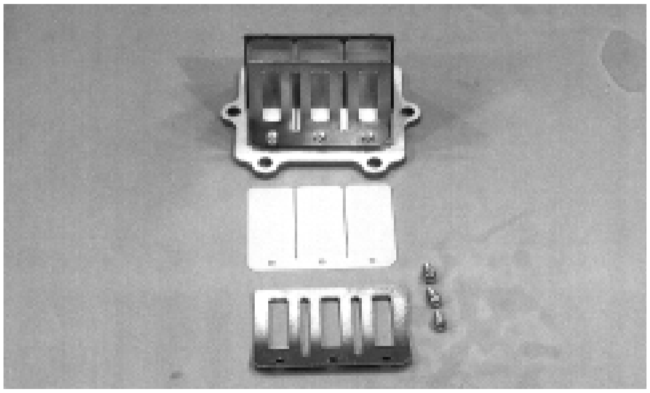


726-306B

■ **NOTE: If the reed seats were removed, place each seat with new gasket into position on the cylinder, apply blue Loctite #242 to the screws, and tighten securely.**

29. Place the reed valve (with the beveled corner positioned toward the lower right-hand corner) and stopper into position on the seat; then apply blue Loctite #242 to the screws and tighten securely.

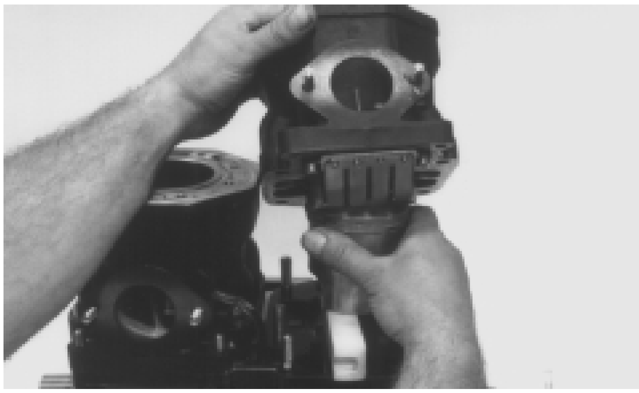
Fig. 2-349



AQ087

30. In turn on each cylinder, place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase; then using a ring compressor or the fingers, compress the rings and slide the cylinder over the piston. Remove the piston holder and seat the cylinder firmly onto the crankcase.

Fig. 2-350

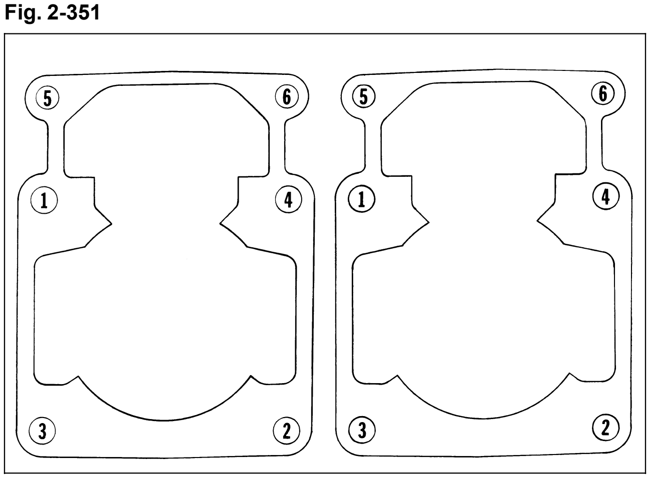


AJ112

⚠ CAUTION
When installing the cylinders, care must be taken not to bend or damage the reed stopper.

31. Secure each cylinder by installing the six nuts, four washers, and lock washers. Tighten the 8 mm cylinder base nuts to 1.8 - 2.8 kg-m (13-20 ft-lb) and the 10 mm nuts to 4.0 - 6.0 kg-m (29-43.5 ft-lb). Tighten all the nuts in three steps using the pattern shown.

Fig. 2-351



0726-376

32. Place the O-rings into position on the top of each cylinder.

Fig. 2-352

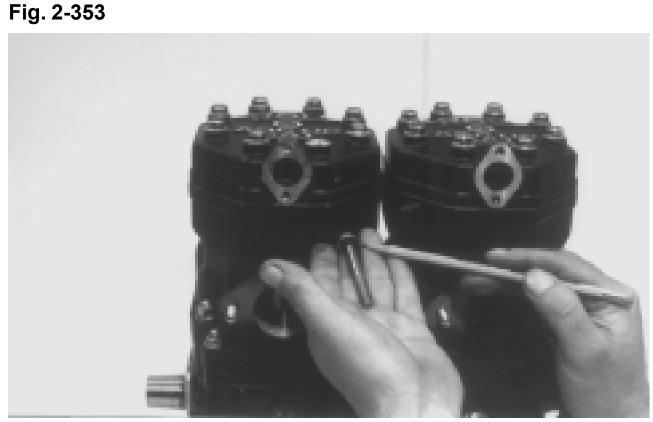


AJ118

■ **NOTE: If reusing O-rings and they are slightly stretched, shrink the O-rings by cooling them (in a refrigerator for example) for a short period of time.**

33. Check sealing surface to make sure the surface is clean; then set the cylinder heads in position. Slide an O-ring onto each of the 16 cap screws and start all the head cap screws. DO NOT TIGHTEN AT THIS TIME.

Fig. 2-353



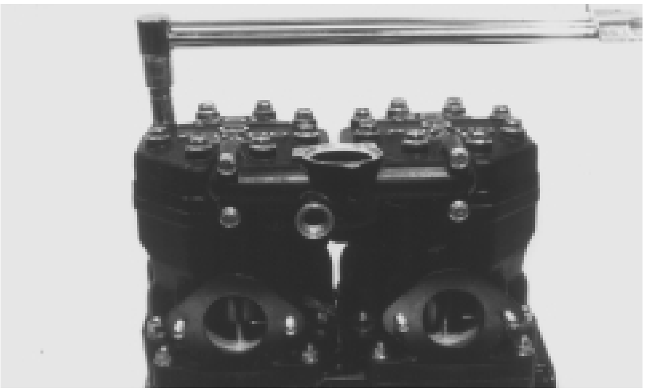
AJ119

34. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the two thermostat manifold gaskets. Place the gaskets and housing into position and secure with four cap screws and washers. Tighten the four cap screws in a crisscross pattern to 0.7 - 1.0 kg-m (5-7 ft-lb).

■ **NOTE: The thermostat manifold cap screws must be tightened before tightening the head cap screws. This will allow the gasket surfaces of the head to align with the housing and prevent any coolant leakage.**

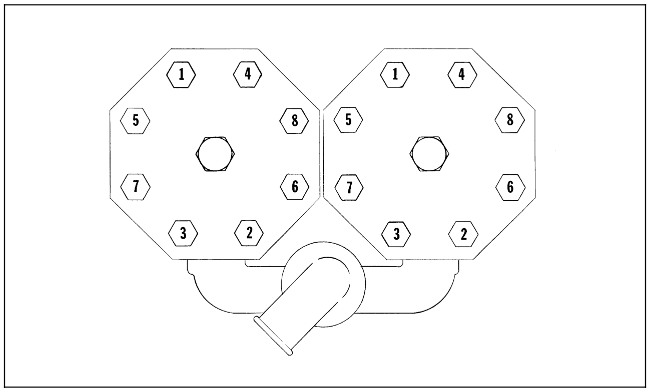
35. Tighten the head cap screws in three steps to 1.8 - 2.8 kg-m (13-20 ft-lb) using the pattern shown.

Fig. 2-354



AJ121

Fig. 2-355



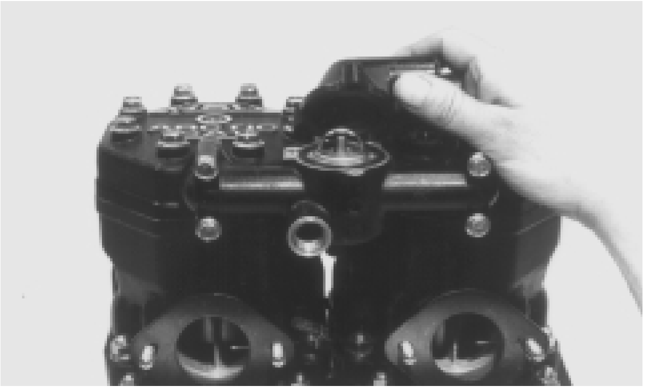
0727-158

36. Install the oil-injection hose on each cylinder nozzle and secure with a hose clamp.

37. Test the engine for air leaks (see Section 3).

38. Place the thermostat with gasket and cap into position. Secure with three cap screws. Tighten to 0.7 - 1.0 kg-m (5-7 ft-lb).

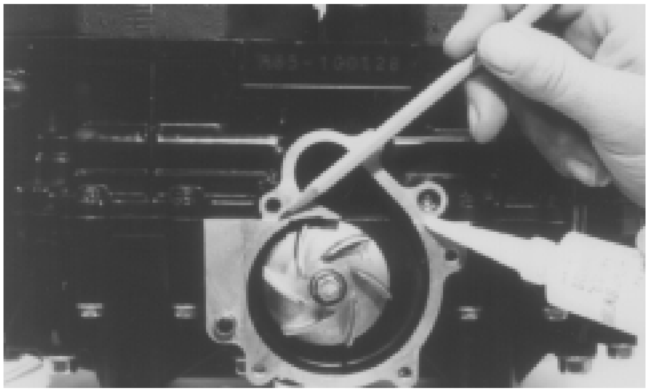
Fig. 2-356



AJ123

39. Apply a thin coat of silicone sealant to the crankcase water pump housing sealing surface.

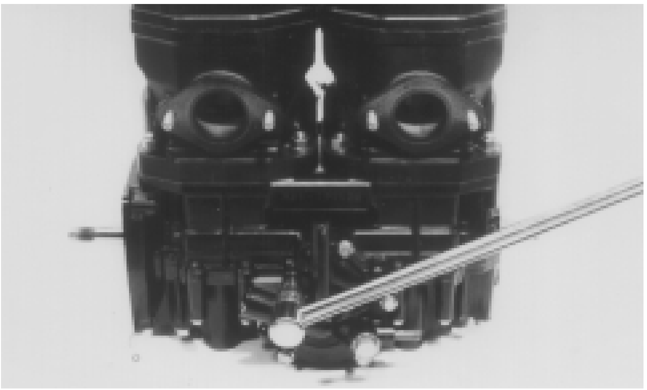
Fig. 2-357



AJ115

40. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the water pump cover seal and position the O-ring into the cover. Carefully place the cover over the impeller and onto the crankcase. Secure with five cap screws. Tighten cap screws evenly to 0.7 - 1.0 kg-m (5-7 ft-lb).

Fig. 2-358



AJ116

41. Install the trigger coil and secure to the crankcase using two screws and mounting bracket. Route wires out through grommet opening in the crankcase.

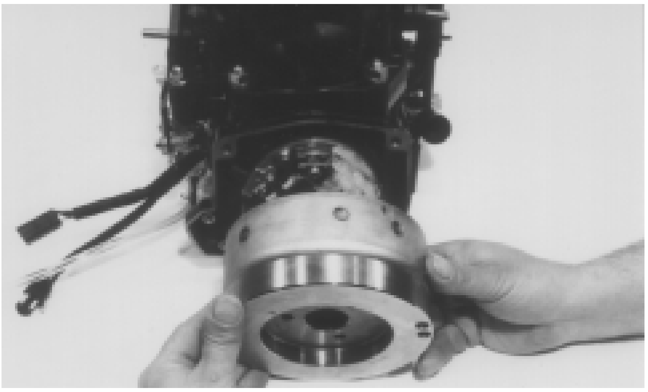
42. Install the stator backing plate and secure with four cap screws. Apply blue Loctite #242 to the threads of each cap screw before installation.

43. Route the stator wiring harness through the backing plate and install the rubber grommet around the harness.

44. Place the stator plate into position and secure with three screws coated with blue Loctite #242, lock washers, and washers.

45. Install the key in the crankshaft and slide the flywheel onto the crankshaft making sure the keyways align.

Fig. 2-359

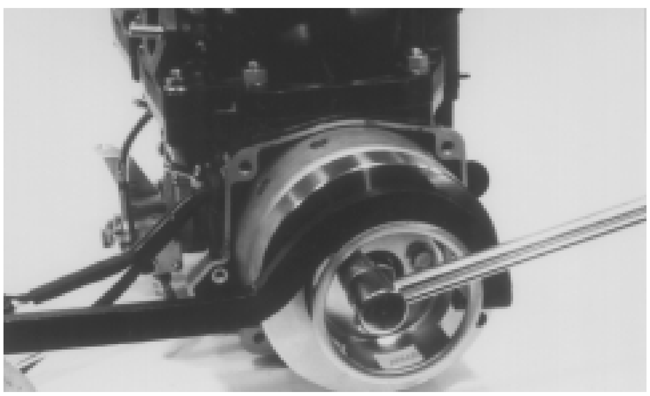


AJ128

46. Apply blue Loctite #242 to the crankshaft threads; then install the flat washer, lock washer, and nut securing the flywheel. Tighten nut finger tight.

47. Place the starter pulley into position on the flywheel and secure with three cap screws coated with blue Loctite #242. Tighten the three cap screws evenly to 1.8 - 2.2 kg-m (13-16 ft-lb).

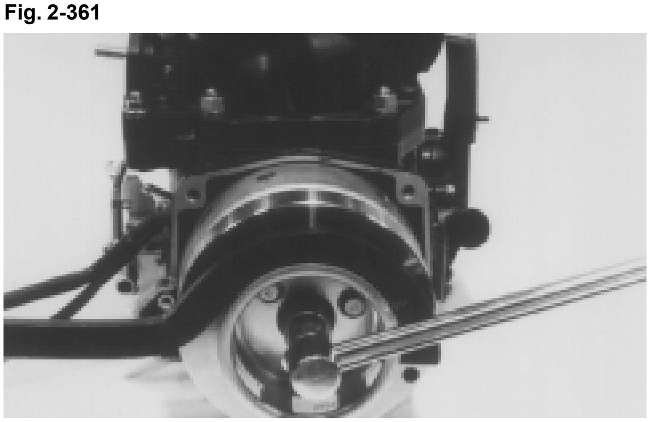
Fig. 2-360



AJ130

48. Using a spanner wrench, tighten the flywheel nut to 7.0 - 9.0 kg-m (50-65 ft-lb).

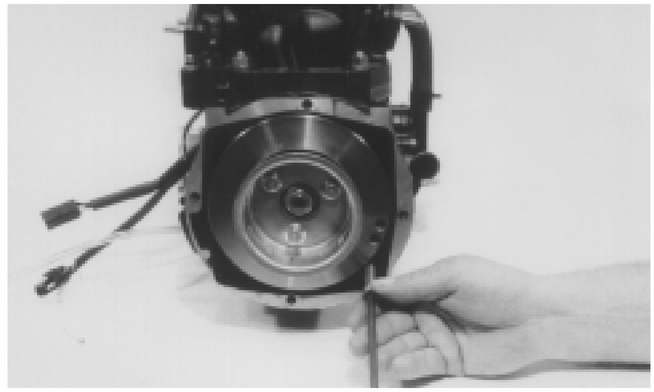
Fig. 2-361



AJ131

49. Place the magneto-case cover into position and secure with four Allen-head cap screws coated with blue Loctite #242. Tighten to 1.8 - 2.2 kg-m (13-16 ft-lb).

Fig. 2-362

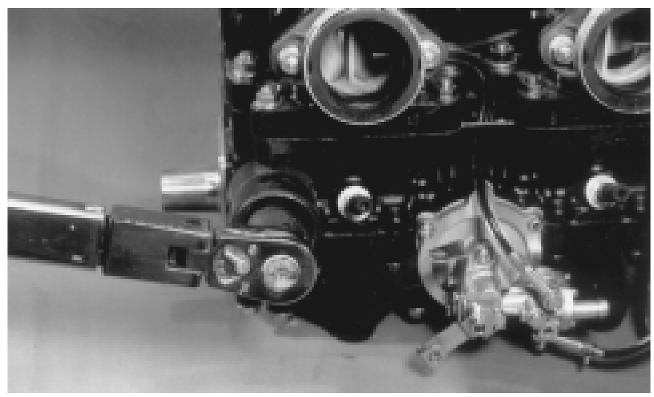


AJ132

50. Place the front and right rear mounting brackets into position on the crankcase. Secure with cap screws coated with blue Loctite #242; then tighten the cap screws to 2.4 kg-m (17 ft-lb).

51. Secure the rear PTO-side engine mount to the crankcase. Tighten to 1.4 kg-m (10 ft-lb).

Fig. 2-363



AN138

SHIMMING PINION GEAR

⚠ CAUTION

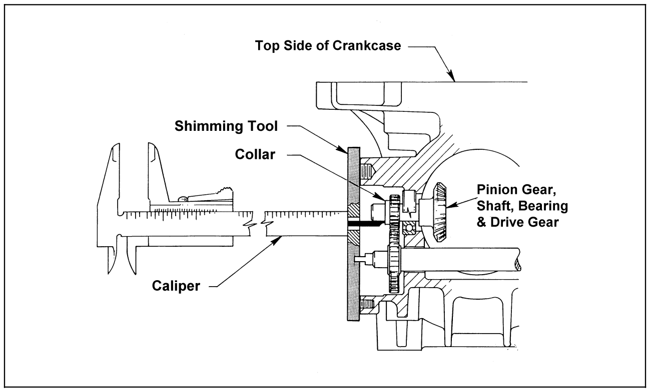
If either the crankshaft or pinion gear assembly has been replaced, pinion gear backlash must be checked.

■ **NOTE: In order to check pinion gear backlash, a caliper and the Pinion Shimming Tool (p/n 0644-055) must be used.**

1. Place the shimming tool against the oil-injection pump retainer seal surface. The center hole of the tool must be positioned just to one side of the pinion shaft.

2. Insert the measuring beam of the caliper through the hole of the tool and up against the shoulder of the pinion gear.

Fig. 2-364



0727-556

3. While holding the tool tight against the crankcase, read the caliper. Compare the reading to the following chart and select the appropriate shim or shims as necessary.

■ **NOTE: If the required shim thickness is between 2.0 and 3.0 mm, use two of the shims to obtain the correct shimming thickness.**

CALIPER READING	SHIM THICKNESS	CALIPER READING	SHIM THICKNESS
21.51 - 21.6	1.0	22.61 - 22.7	2.1
21.61 - 21.7	1.1	22.71 - 22.8	2.2
21.71 - 21.8	1.2	22.81 - 22.9	2.3
21.81 - 21.9	1.3	22.91 - 23.0	2.4
21.91 - 22.0	1.4	23.01 - 23.1	2.5
22.01 - 22.1	1.5	23.11 - 23.2	2.6
22.11 - 22.2	1.6	23.21 - 23.3	2.7
22.21 - 22.3	1.7	23.31 - 23.4	2.8
22.31 - 22.4	1.8	23.41 - 23.5	2.9
22.41 - 22.5	1.9	23.51 - 23.6	3.0
22.51 - 22.6	2.0		

Assembling Engine
(600 cc Triple Models)

■ **NOTE: Arctic Cat recommends the use of new gaskets and end seals when assembling the engine.**

1. Using the Water Pump Bearing and Seal Kit (p/n 0644-084), position the inner water pump shaft seal onto the special seal driver and gently tap the seal down into position.

■ **NOTE: The seal must be installed with its spring side towards the crankshaft.**

2. Apply a thin coat of grease to the inner seal lips.

3. Using a pair of snap ring pliers, install the snap ring securing the inner seal in the crankcase.

4. Using the seal driver, carefully install the outer water pump seal. Gently tap the seal down into position until it seats itself against its flange.

Fig. 2-365



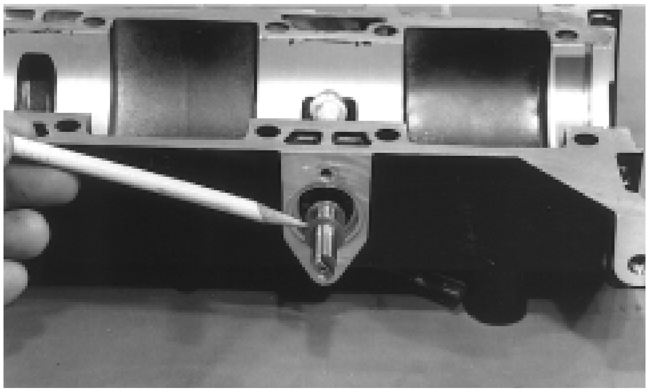
AN072

5. Apply a light coat of grease to the sealing surface of the oil-injection pump driveshaft; then install the Oil Seal Installation Tool (p/n 0644-219) at the end of the shaft. Twist the shaft clockwise as it is pushed through the oil-injection and water pump seals; then remove the tool. Position the shim on the oil-injection pump end of the driveshaft.

⚠ CAUTION
Be very careful not to damage the seals when installing the pump driveshaft. Be certain to use Oil Seal Installation Tool (p/n 0644-219).

2

Fig. 2-366



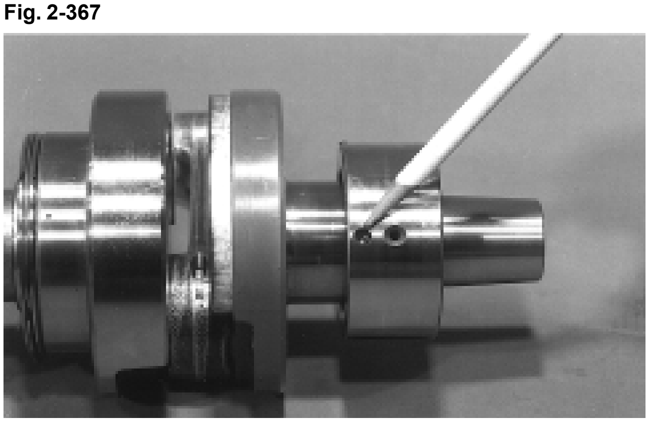
AN205

6. Position the upper crankcase half upside-down on two wooden blocks; then install the C-ring and dowel pins.

7. Place the PTO-side crankshaft bearing into position making sure the bearing dowel pin hole is positioned inward.

■ **NOTE: The dowel pin hole is the hole that doesn't go entirely through the bearing case.**

Fig. 2-367



AN152

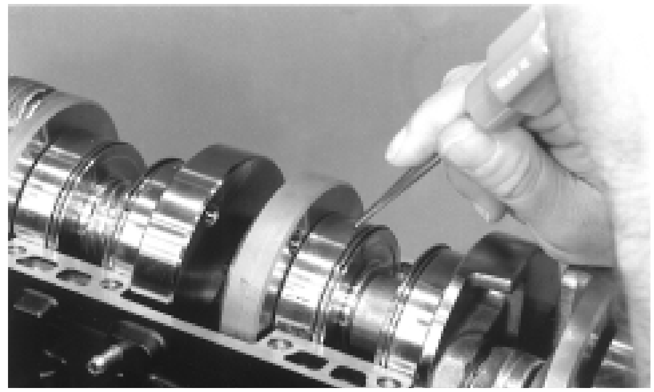
8. Lubricate the inner lips of the crankshaft end seals with grease; then slide the seals onto the crankshaft making sure the spring side of each seal faces the bearing on the crankshaft.

■ **NOTE: There is a MAG-side seal and a PTO-side seal.**

9. Apply oil to the crankshaft bearings; then install the crankshaft into the upper crankcase half. Be sure the alignment hole in each bearing is positioned over its respective dowel pin in the crankcase; then seat the crankshaft.

■ **NOTE: To check the bearing for proper position, place the point of a sharp tool into the dimple found in the bearing race. Strike the tool with the palm of the hand in either direction. If the bearing moves, it isn't positioned correctly and must be rotated until it drops onto the dowel pin.**

Fig. 2-368



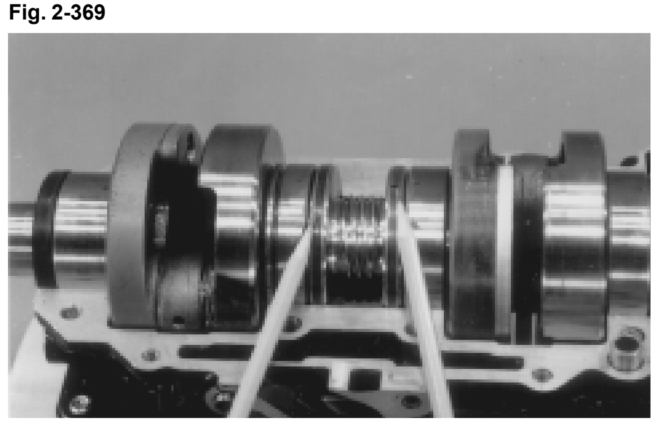
AN203

⚠ CAUTION

If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and severe engine damage will result.

10. The sealing rings must be located so none of the end gaps align. Rotate the rings to "stagger" the end gaps.

Fig. 2-369



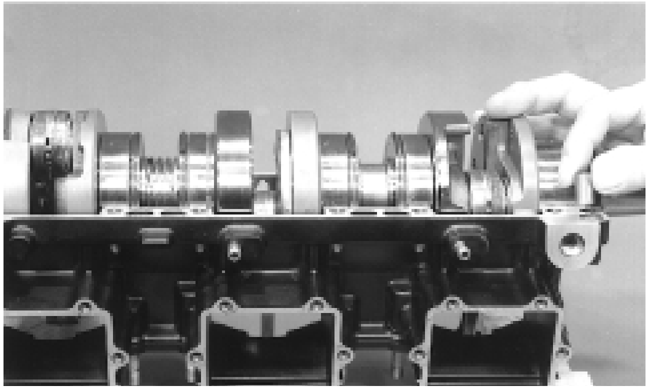
AN083

11. Apply a light coat of High-Temp Sealant (p/n 0636-069) to the entire sealing surface of the bottom half of the crankcase. Install the two dowel pins into the corners of the crankcase.

⚠ CAUTION

When installing the crankcase dowel pins, use the two long dowel pins. The six shorter pins must be used to align the cylinders.

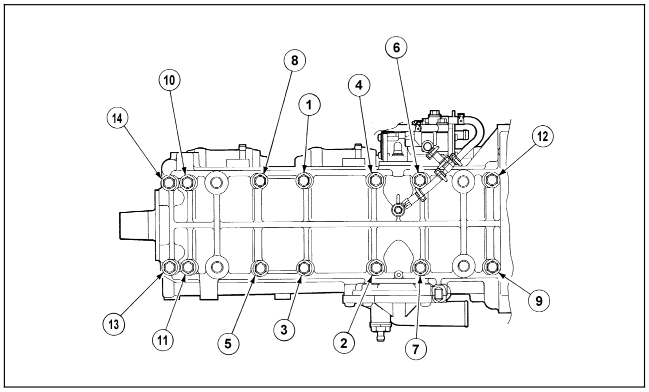
Fig. 2-370



AN201

12. Place the bottom crankcase half into position and install the 14 crankcase cap screws. Tighten the cap screws evenly by hand starting in the center; then tighten the cap screws in three steps to 2.8 kg-m (20 ft-lb). Follow the pattern shown.

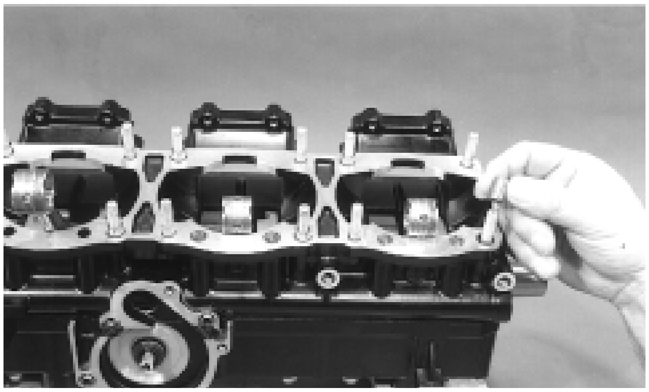
Fig. 2-371



0731-342

13. Set the engine upright. On the appropriate crankcase cylinder mounting studs, position two dowel sleeves per cylinder. Install the cylinder base gaskets.

Fig. 2-372



AN197

■ **NOTE: The cylinder base gaskets can be reused if not damaged. When reusing a gasket, coat each side with Copper Coat Gasket Sealant (p/n 0636-092).**

14. Pre-oil the piston pin bearings and place into position in the connecting rods; then place a thrust washer on each end of the bearing. The flat side of each washer must face outward.

Fig. 2-373



AN194

15. Place the piston over the connecting rod so the arrow on the piston dome will point towards the exhaust port of the cylinder; then apply a light coat of oil to the piston pin and install.

Fig. 2-374



AN193

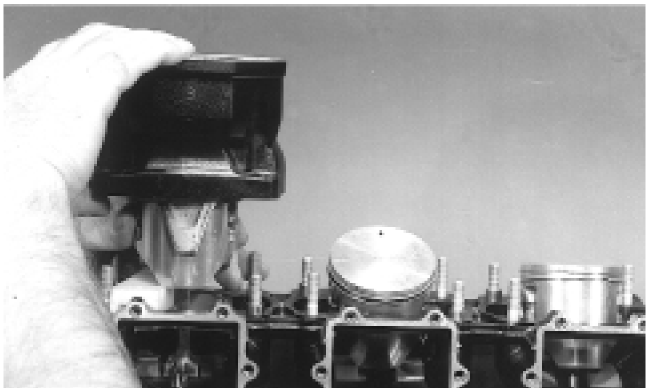
16. Install the piston rings on the piston with their tapered side "up."

17. Secure the piston pin by installing new piston pin circlips. Install the circlip with the open end up.

18. Apply oil to the piston rings and pistons; then rotate the rings to correctly position them on either side of the locating pin in the ring groove. Place a short piece of wear strip under the piston to keep it square; then compress the piston rings with one hand and slide the cylinder down onto the piston.

2

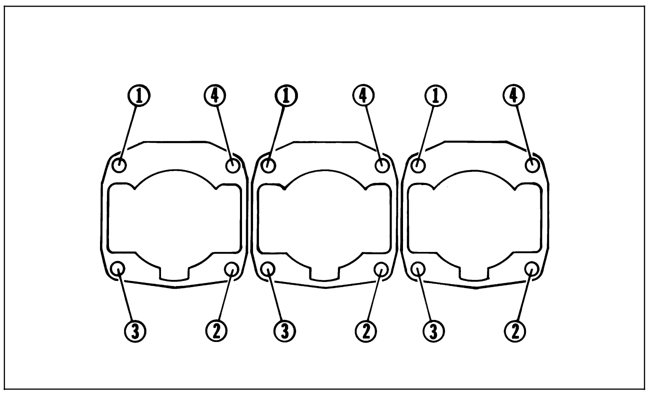
Fig. 2-375



AN190

19. Align the cylinder exhaust ports using a straight edge; then secure each cylinder base with four flanged nuts. In three steps, tighten the nuts to 1.8-2.8 kg-m (13-20 ft-lb).

Fig. 2-376



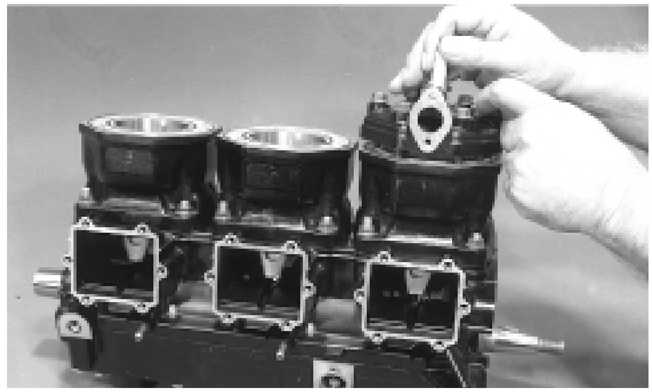
0729-585

20. Place the cylinder head O-rings into position on each cylinder.

■ **NOTE: If reusing O-rings and they are slightly stretched, shrink the O-rings by cooling them (in a refrigerator for example) for a period of time.**

21. Being very careful not to move the two O-ring seals, hold the cylinder head above the cylinder approximately 1/4 in. and start the cap screws into the cylinder; then check the O-rings for proper position and set the head carefully down onto the cylinder. Finger-tighten the cap screws at this time.

Fig. 2-377



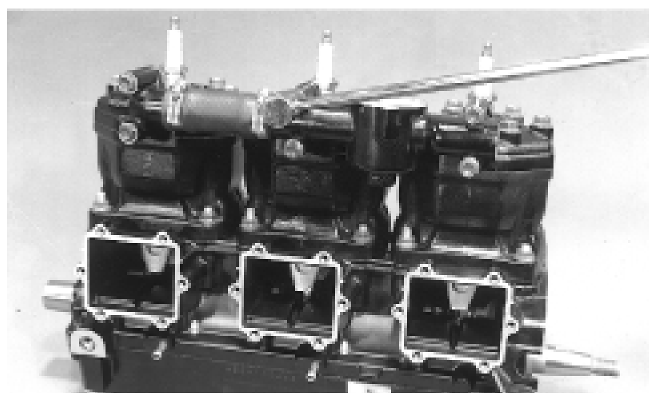
AN188

⚠ CAUTION

Be very careful not to move the cylinder heads once they are placed on top of the O-rings.

22. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the three water manifold gaskets. Place the gaskets and manifold into position and secure with six cap screws. Using a crisscross pattern, tighten to 0.7-1 kg-m (5-7 ft-lb).

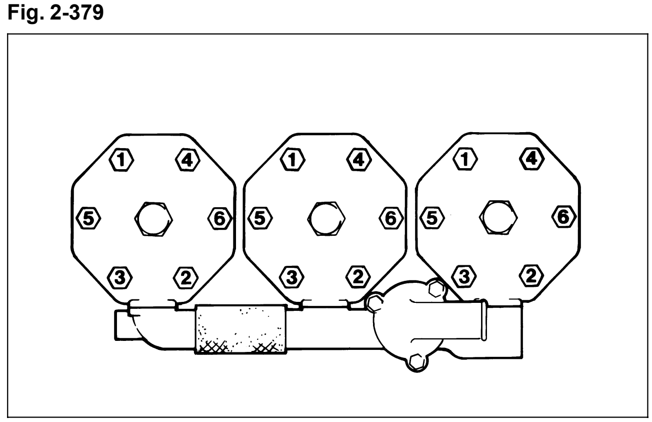
Fig. 2-378



AN187

23. Tighten the cylinder head cap screws in three steps using the pattern shown to 2-2.5 kg-m (14.5-18 ft-lb).

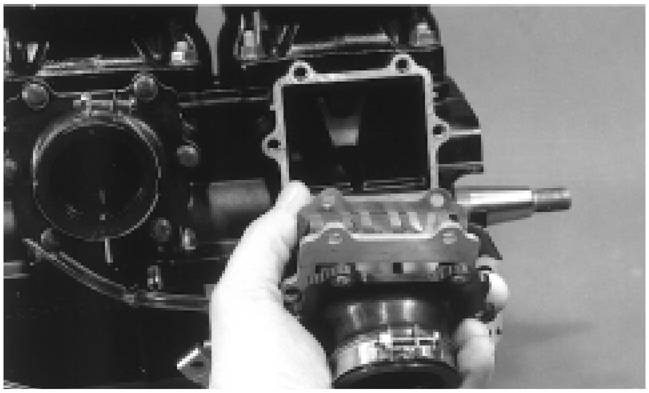
Fig. 2-379



0729-587

24. In turn for each cylinder, install the gasket, reed block assembly, and carburetor flange to the crankcase; then secure with six cap screws. Tighten to 0.8-1.2 kg-m (6-9 ft-lb).

Fig. 2-380

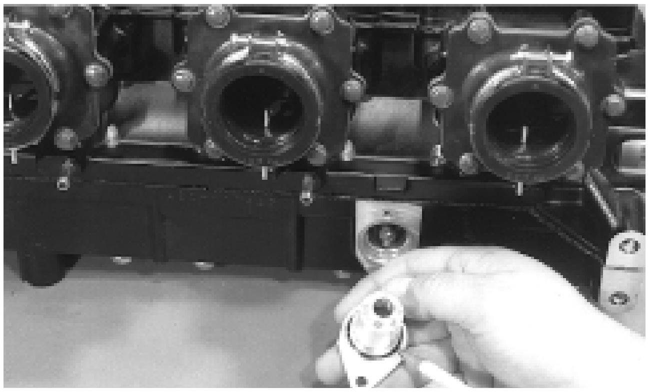


AN213

25. Place the thrust washer on the outward end of the oil-injection pump driveshaft.

26. Apply a light coat of oil to the shaft adapter; then install the O-ring and slide the adapter into position on the pump driveshaft.

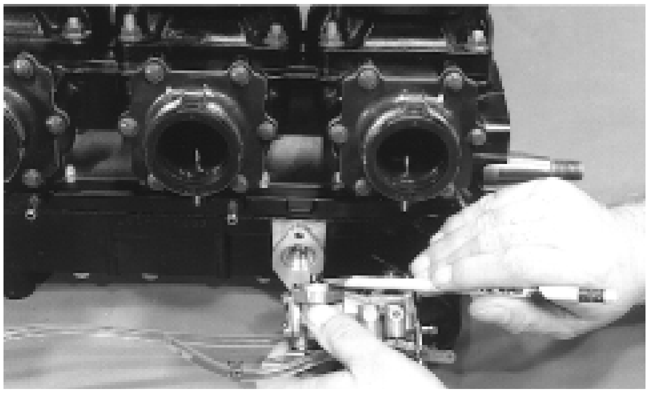
Fig. 2-381



AN184

27. Being careful to align the slot of the oil-injection pump shaft with the flat end of the oil-injection pump driveshaft, install the pump on the crankcase and secure with two screws.

Fig. 2-382



AN183

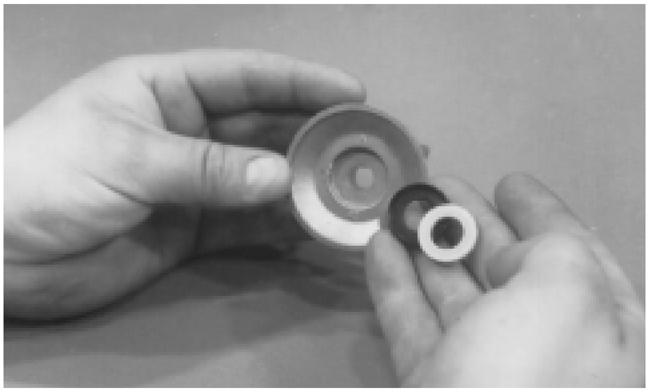
⚠ CAUTION

When installing the oil-injection pump, the pump driveshaft must align with the pump shaft or serious damage will result.

28. Position the rubber seal retainer and seal into the back side of the water pump impeller.

■ NOTE: The lined or marked side of the porcelain seal must face the rubber retainer.

Fig. 2-383



AN091

29. Using both thumbs, press the seal into position making sure its marked side is positioned towards the rubber retainer.

30. Apply a light coat of grease to the seal outer surface.

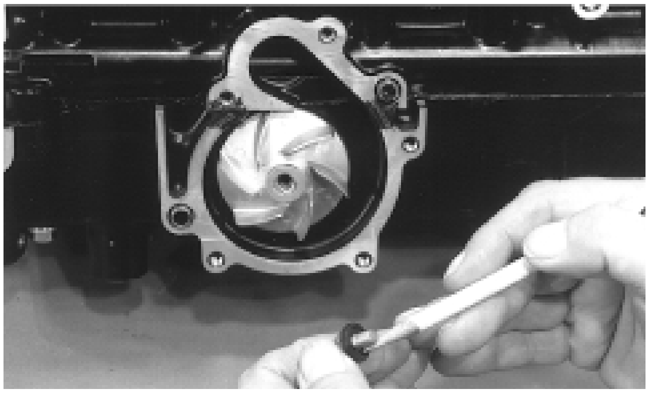
31. Place the impeller into position and secure with a cap screw and washer. Be sure the rubber side of the washer is directed toward the impeller.

32. Apply blue Loctite #242 to the threads of the cap screw and tighten to 0.8-1.2 kg-m (6-9 ft-lb).

⚠ CAUTION

The rubber side of the washer which secures the impeller must be positioned toward the impeller. If installed incorrectly, a coolant leak will result.

Fig. 2-384

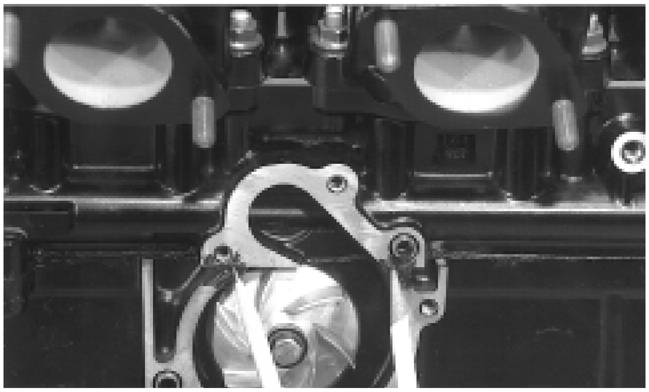


AN181

2

33. Apply sealant to the crankcase seam; then install the alignment pins into the crankcase.

Fig. 2-385



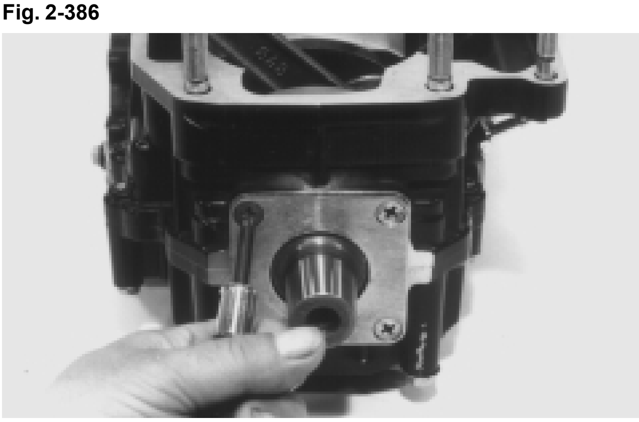
AN179

■ **NOTE: Sealant is only required on the crankcase seam.**

34. Position the O-ring into the water pump cover; then install the cover. Secure with five screws. Tighten securely.

35. Place the seal protector plate into position on the crankcase; then apply blue Loctite #242 to the four screws and secure.

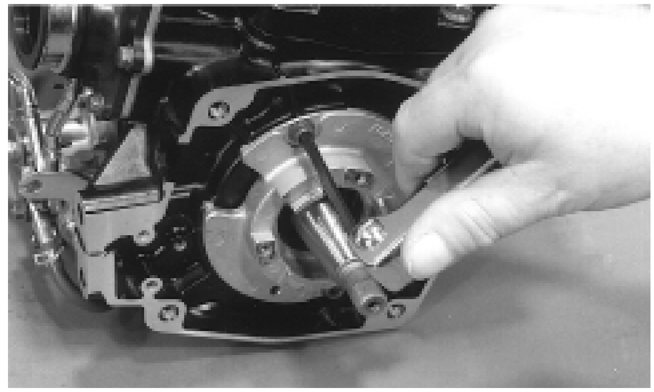
Fig. 2-386



AJ103

36. Install the stator plate with the large notch for the wiring harness in the 10 o'clock position; then secure with two cap screws.

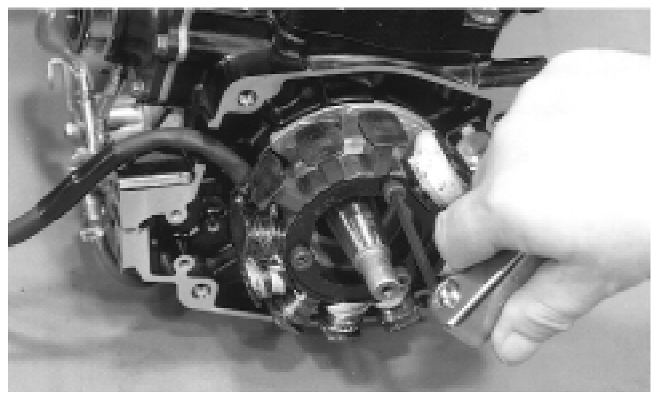
Fig. 2-387



AN170

37. Install the stator; then route the wiring harness through the crankcase housing and install the rubber grommet. Apply blue Loctite #242 to the threads of the three Allen-head cap screws and secure the stator to the stator plate.

Fig. 2-388



AN171

38. Set the timing sensor into position in the magneto housing. Apply blue Loctite #242 to the threads of the two screws and secure the timing sensor to the housing.

Fig. 2-389



AN172

39. Secure the timing sensor wiring harness to the magneto housing using the tab plate and screw. Apply blue Loctite #242 to the screw threads and tighten securely.

Fig. 2-390

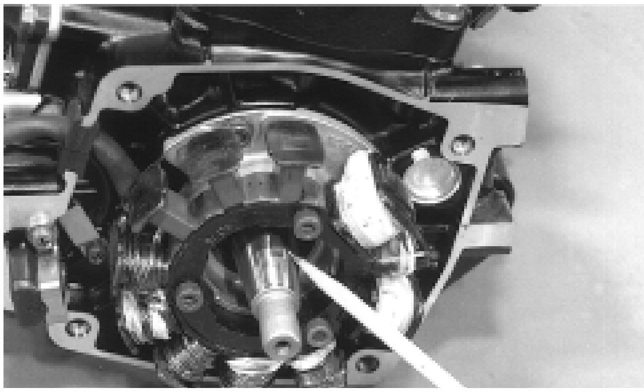


AN173

■ **NOTE: Wipe the flywheel and crankshaft taper with a clean cloth to remove any foreign material.**

40. Install the flywheel key in the crankshaft; then slide the flywheel onto the crankshaft making sure the keyways align. Install, but do not tighten, the flat washer, lock washer, and flywheel nut.

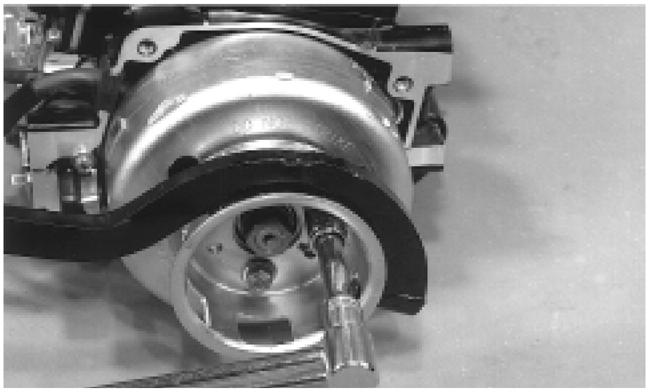
Fig. 2-391



AN174

41. Install the starter pulley and secure with three cap screws. Tighten to 0.8-1.2 kg-m (6-9 ft-lb).

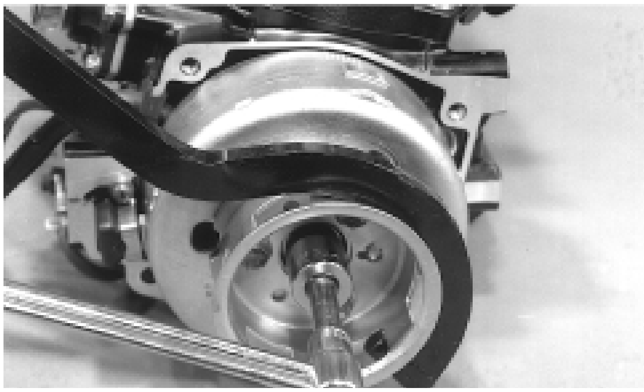
Fig. 2-392



AN175

42. Tighten the flywheel nut to 7-9 kg-m (50.5-65 ft-lb).

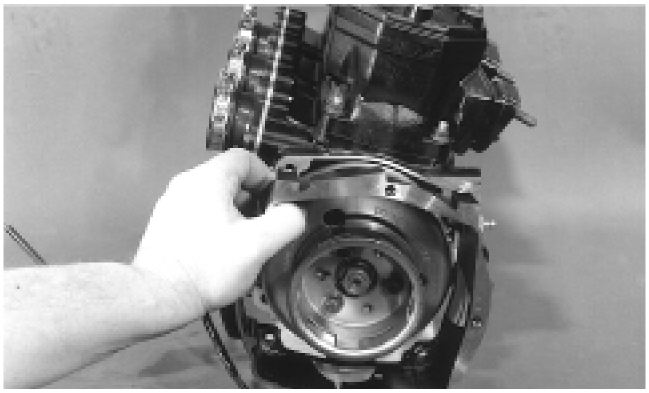
Fig. 2-393



AN176

43. Install the magneto housing; then apply blue Loctite #242 to the four Allen-head cap screws and secure. Tighten to 1.8-2.2 kg-m (13-16 ft-lb).

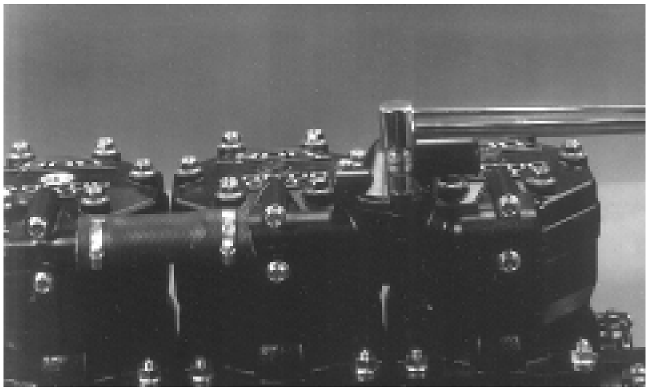
Fig. 2-394



AN165

44. Install the thermostat with its rubber seal and thermostat cover. Secure with three cap screws. Tighten to 0.7-1 kg-m (5-7 ft-lb).

Fig. 2-395



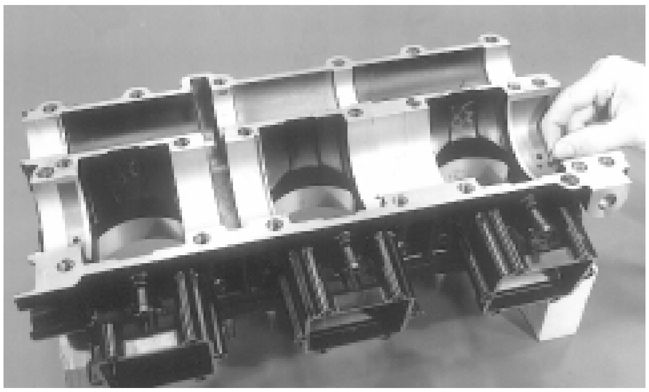
AQ079

45. Pressure test the engine (see Section 3).

Assembling Engine
(800/1000 cc Models)

1. Set the top half of the crankcase on the work bench with a wooden block under each end; then install the seven bearing locating pins into the crankcase.

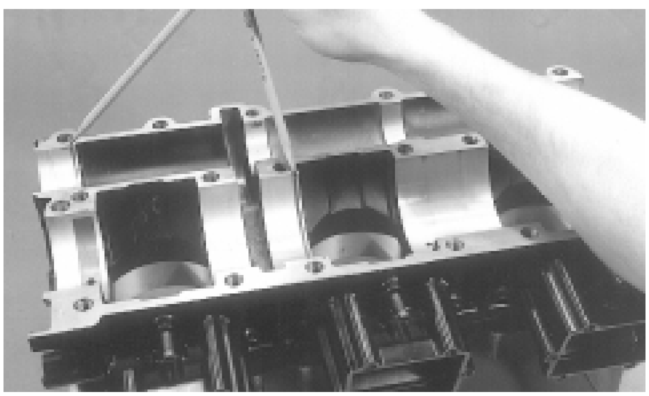
Fig. 2-396



AQ048

2. Install the two C-clips into the crankcase.

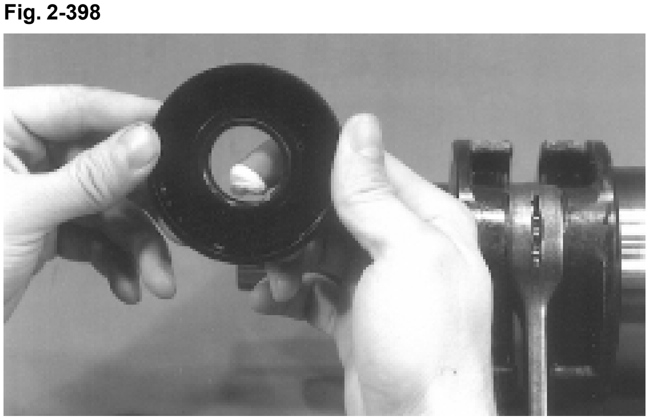
Fig. 2-397



AQ049

3. Apply bearing grease to the lips of the end seals.

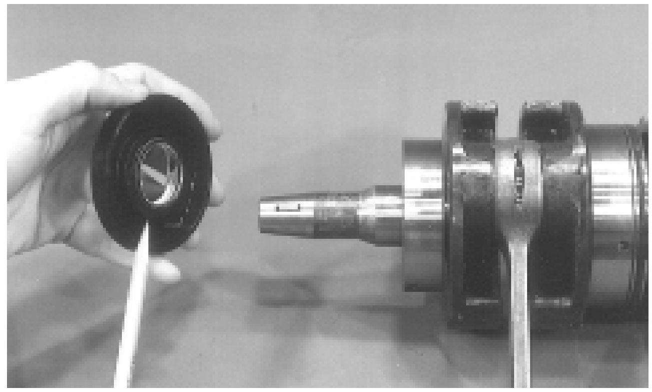
Fig. 2-398



AQ050

4. Install the two end seals onto the crankshaft with the spring side facing the bearing.

Fig. 2-399

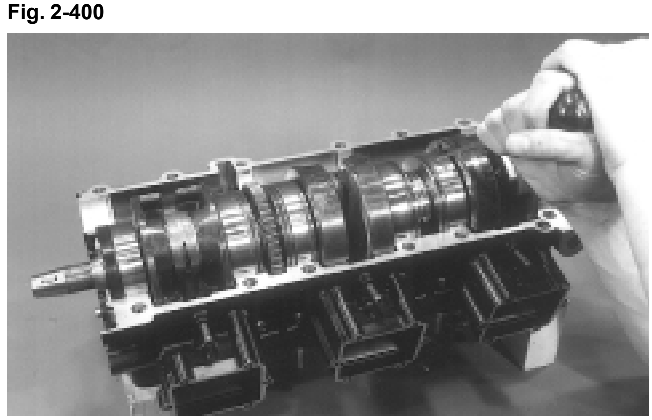


AQ051

5. Set the crankshaft into the crankcase. Rotate each bearing until its hole in the outer race drops onto the locating pin. Check each bearing to make sure it is properly positioned.

■ **NOTE: To check the bearing for proper position, place the point of a sharp tool into the dimple found in the bearing race. Strike the tool with palm of the hand in either direction. If the bearing moves, it isn't positioned correctly and must be rotated until it drops onto the pin.**

Fig. 2-400

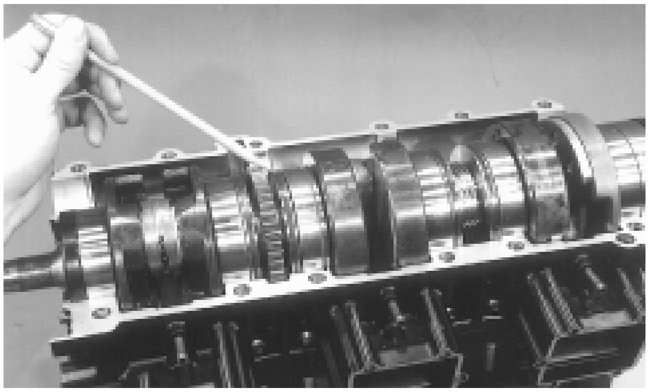


AQ052

⚠ CAUTION
If the bearings are not properly seated during assembly, the crankcase halves will not seal tightly and severe engine damage will result.

6. The sealing rings must be located so none of the end gaps align. Rotate the rings to "stagger" the end gaps.

Fig. 2-401

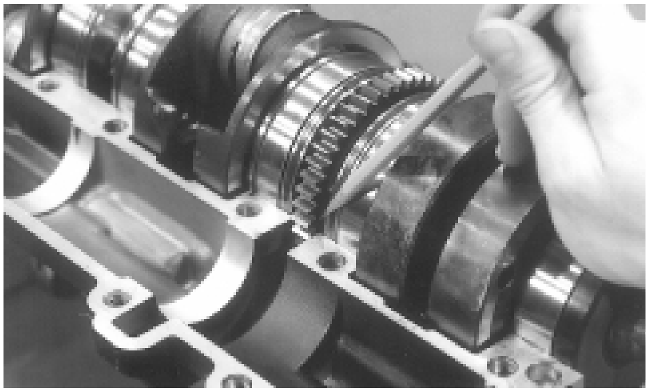


AQ053

7. Rotate the crankshaft while observing the timing mark on the side of the gear. Align the timing mark with the parting surface of the crankcase.

■ NOTE: Before installing the balancer shaft, pack the bearings with grease. It is recommended that Arctic Cat Low-Temp Grease (p/n 0636-593) be used for this purpose.

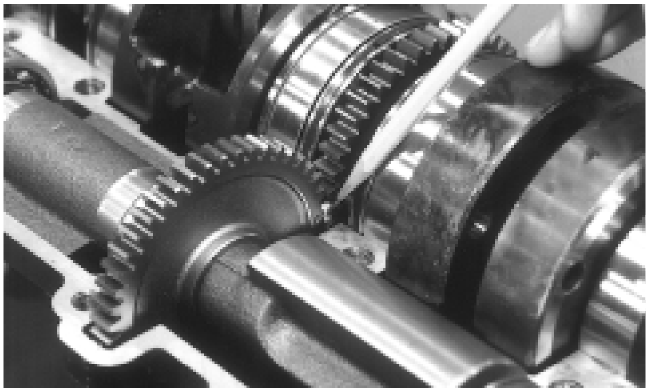
Fig. 2-402



AQ054

8. Locate the timing mark on the balancer shaft gear; then set the shaft into position aligning its timing mark with the timing mark of the crankshaft gear.

Fig. 2-403

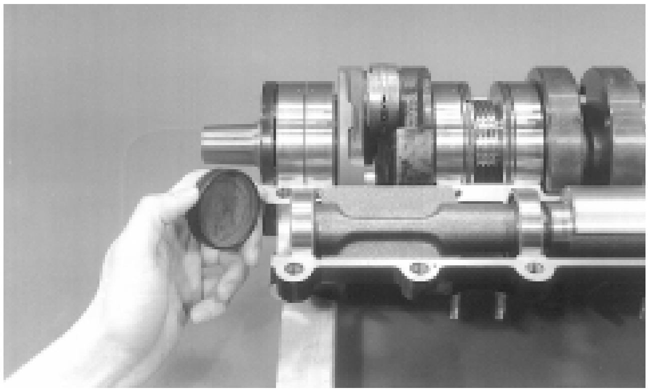


AQ055

9. Set the balancer shaft seal into position against the bearing.

■ NOTE: Using Arctic Extreme 50:1 Injection Oil, pre-oil the crankshaft and balancer shaft bearings at this time.

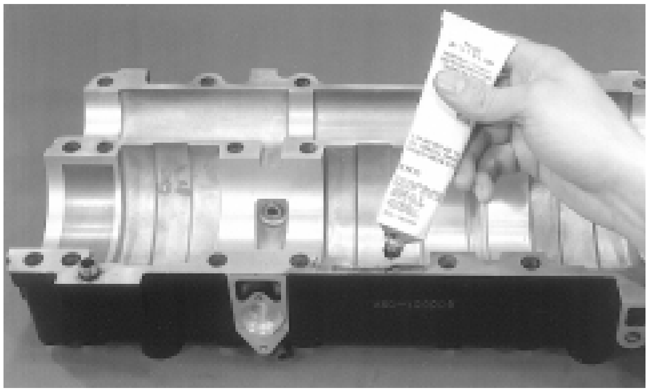
Fig. 2-404



AQ056

10. Apply a light coat of High-Temp Sealant (p/n 0636-069) to the sealing surface of the bottom half of the crankcase. Make sure the entire surface is coated evenly.

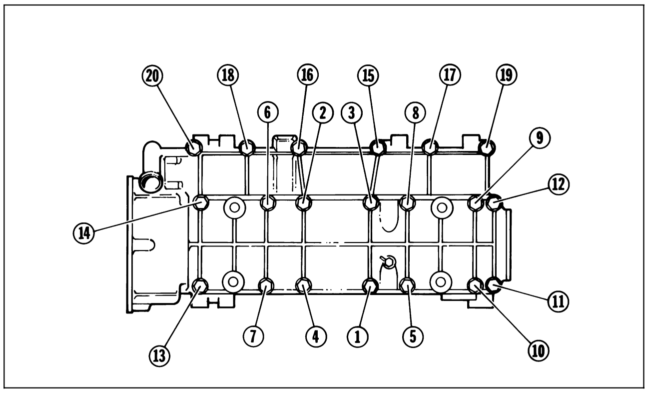
Fig. 2-405



AQ057

11. Place the bottom crankcase half into position and install the twenty crankcase cap screws. Tighten the cap screws evenly by hand starting in the center. Tighten the cap screws in three steps to 4 kg-m (29 ft-lb). Follow the pattern shown.

Fig. 2-406



0729-590

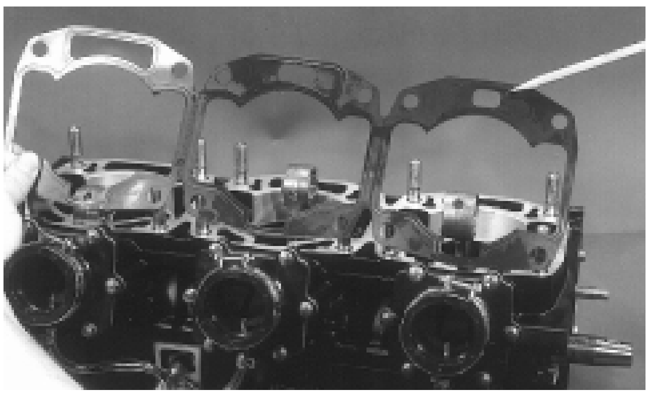
2

12. Set the engine upright. Install the cylinder base gasket making sure the small water passage hole is positioned to the MAG-side.

■ **NOTE: The cylinder base gasket can be reused if not damaged. When reusing a gasket, coat each side with Copper Coat Gasket Sealant (p/n 0636-092).**

⚠ CAUTION
The cylinder base gasket must be installed with the small water passage hole located to the MAG-side of the crankcase or engine damage will result.

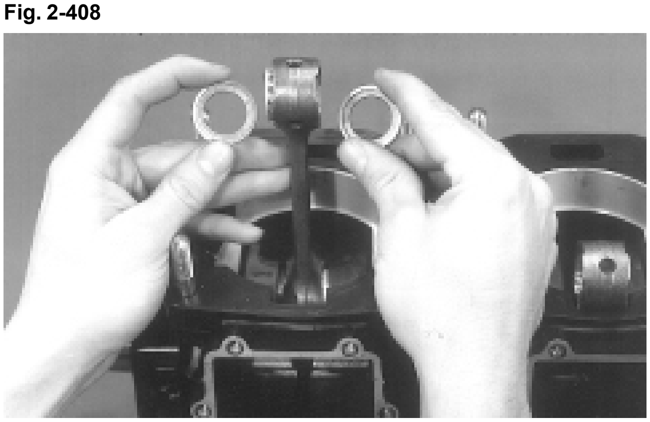
Fig. 2-407



AQ030

13. Pre-oil the piston pin bearings and place into position in the connecting rods; then place a thrust washer on each end of the bearing. The flat side of each washer must face outward.

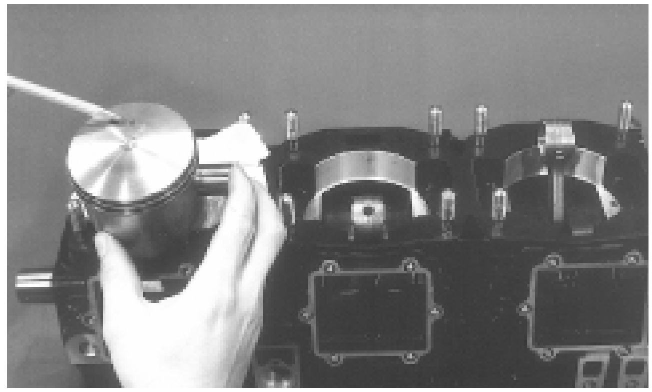
Fig. 2-408



AQ059

14. Place the piston over the connecting rod so the arrow on the piston dome will point towards the exhaust port of the cylinder; then apply a light coat of oil to the piston pin and install.

Fig. 2-409



AQ060

15. Install the piston rings on the piston with their tapered side "up."

16. Secure the piston pin by installing new piston pin circlips. Install the circlip with the open end up.

Fig. 2-410



AQ080

17. Apply oil to the piston rings; then rotate the rings to correctly position them on either side of the locating pin in the ring groove. Place a short piece of wear strip under the piston to keep it square; then compress the piston rings with one hand and slide the cylinder down onto the piston.

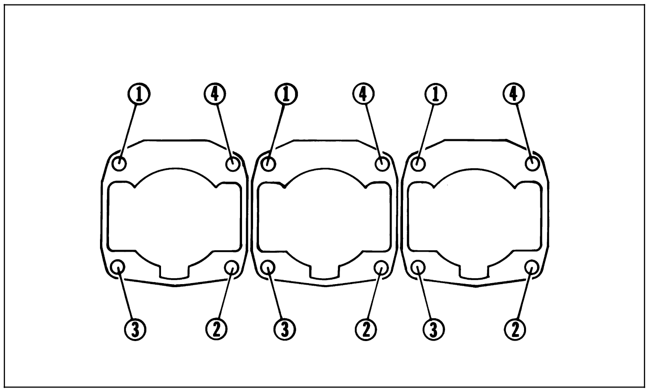
Fig. 2-411



AQ061

18. Align the cylinder exhaust ports using a straight edge; then secure each cylinder base with four washers, lock washers, and nuts. In three steps tighten the nuts to 4-6 kg-m (29-43 ft-lb). Use the pattern shown.

Fig. 2-412

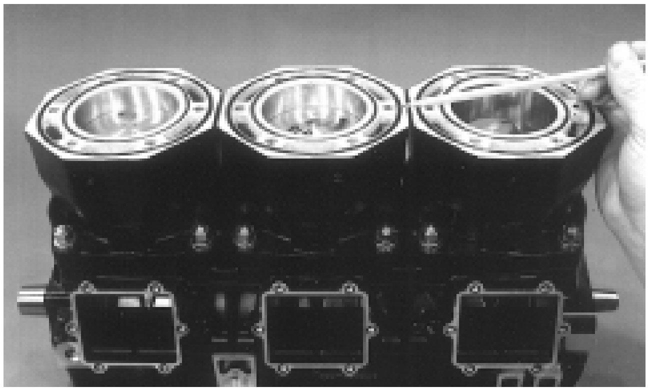


0729-585

19. Place the cylinder head O-rings into position on each cylinder.

■ **NOTE: If reusing O-rings and they are slightly stretched, shrink the O-rings by cooling them (in a refrigerator for example) for a period of time.**

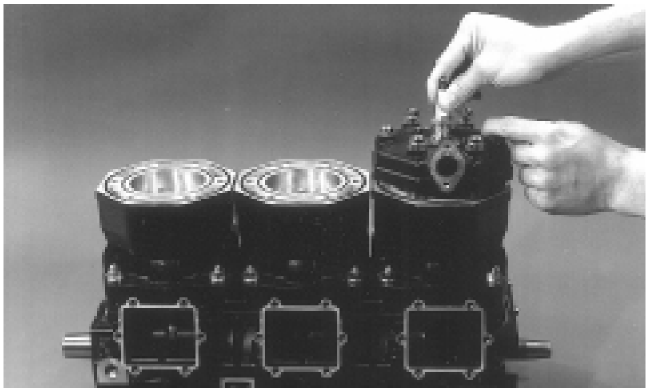
Fig. 2-413



AQ063

20. Being very careful not to move the two O-ring seals, hold the cylinder head above the cylinder approximately 1/4 in. and start the cap screws into the cylinder; then check the O-rings for proper position and set the head carefully down onto the cylinder. Finger-tighten the cap screws at this time.

Fig. 2-414



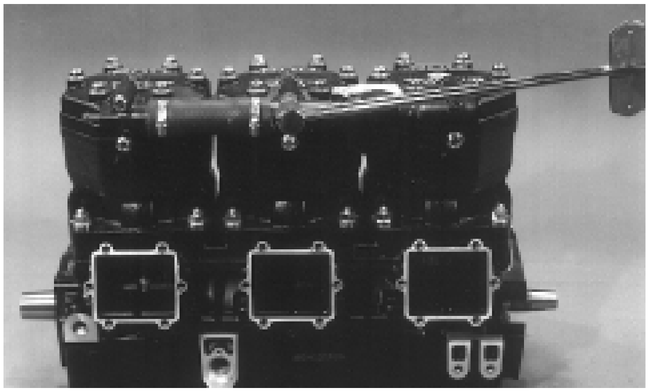
AQ064

⚠ CAUTION

Be very careful not to move the cylinder heads once they are placed on top of the O-rings.

21. Apply a thin coat of High-Temp Sealant (p/n 0636-069) to the three water manifold gaskets. Place the gaskets and manifold into position and secure with six cap screws. Using a crisscross pattern, tighten to 0.7-1 kg-m (5-7 ft-lb).

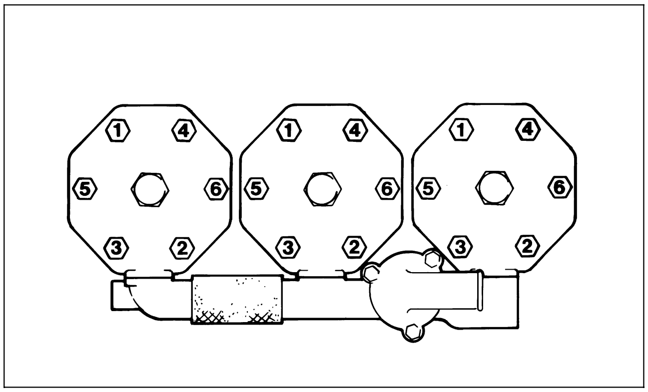
Fig. 2-415



AQ065

22. Tighten the cylinder head cap screws in three steps using the pattern shown to 2-2.5 kg-m (14.5-18 ft-lb).

Fig. 2-416



0729-587

2

23. In turn for each cylinder, install the gasket, reed assembly, and carburetor flange to the crankcase; then secure with six cap screws. Tighten to 0.8-1.2 kg-m (6-9 ft-lb).

Fig. 2-417



AQ066

24. Place the thrust washer on the outward end of the oil-injection pump driveshaft. Lubricate the shaft and install into the crankcase.

25. Apply a light coat of oil to the shaft adapter; then install the O-ring and slide the adapter into position on the oil-injection pump driveshaft.

26. Being careful to align the slot of the oil-injection pump shaft with the flat end of the oil-injection pump driveshaft, install the pump on the crankcase and secure with two screws.

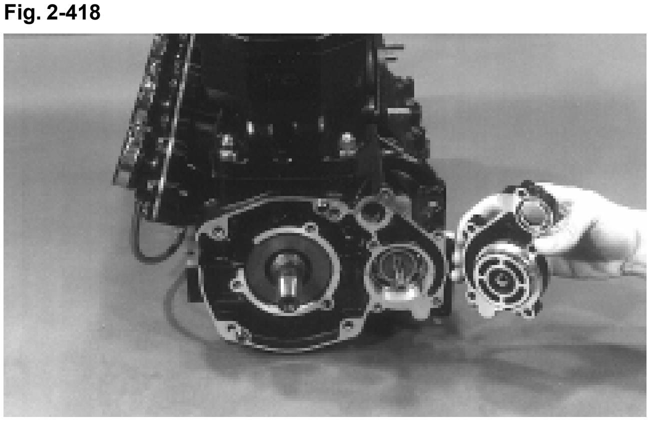
⚠ CAUTION

When installing the oil-injection pump, the pump driveshaft must align with the pump shaft or serious damage will result.

27. Place the PTO-end plate into position on the crankcase; then apply blue Loctite #242 to the four screws and secure.

28. Place the water pump housing into position on the crankcase. Make sure the two O-ring seals on the backside are in their proper position.

Fig. 2-418

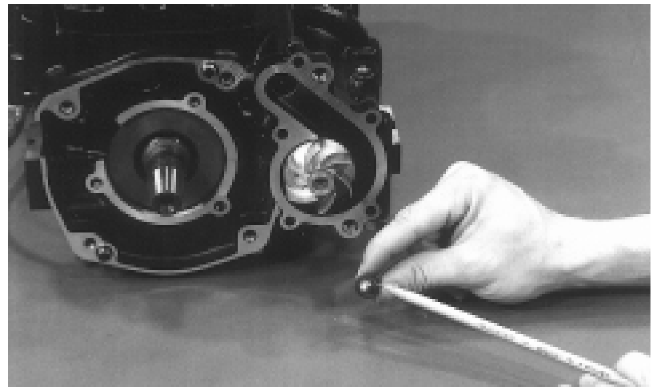


AQ068

29. Install the water pump impeller. Apply blue Loctite #242 to the threads of the impeller cap screw; then install the washer and cap screw. Tighten to 0.8-1.2 kg-m (6-9 ft-lb).

■ **NOTE: The rubber side of the washer must be toward the impeller.**

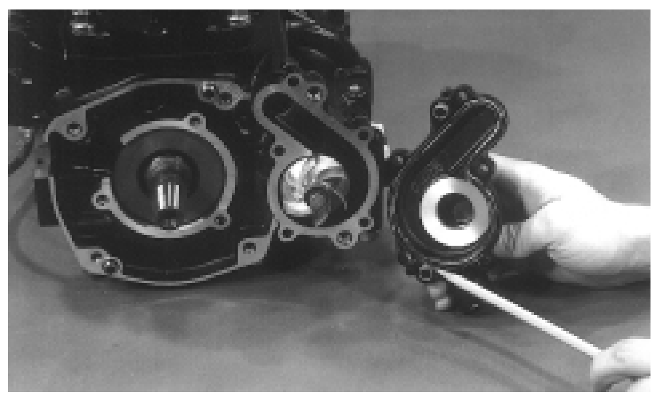
Fig. 2-419



AQ069

30. Install the alignment pins in the water pump cover and apply a low-temperature grease to the cover O-ring seal.

Fig. 2-420



AQ070

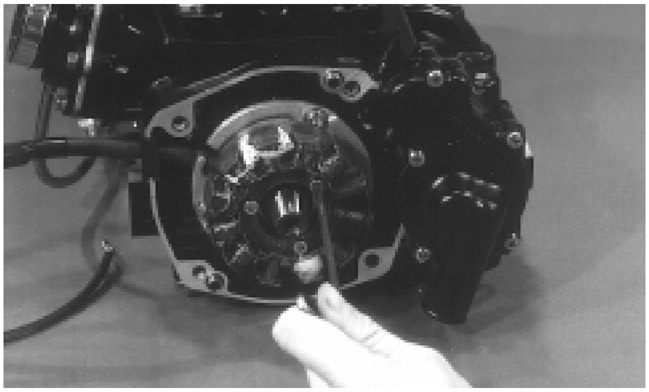
31. Place the water pump cover into position and secure.

32. Install the stator plate with the notch for the wiring harness in the 10 o'clock position; then secure.

33. Install the stator; then route the wiring harness through the stator plate and crankcase housing and install the rubber grommet.

34. Apply blue Loctite #242 to the threads of the three Allen-head cap screws and secure the stator to the stator plate.

Fig. 2-421

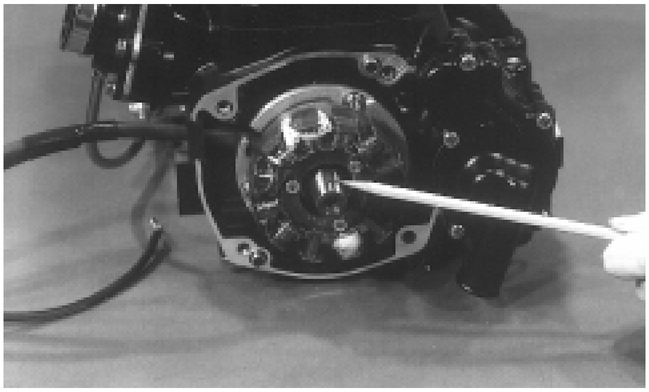


AQ073

■ **NOTE: Wipe the flywheel and crankshaft taper with a clean cloth to remove any foreign material.**

35. Install the flywheel key in the crankshaft; then slide the flywheel onto the crankshaft making sure the keyways align. Install, but do not tighten, the flywheel cap screw.

Fig. 2-422



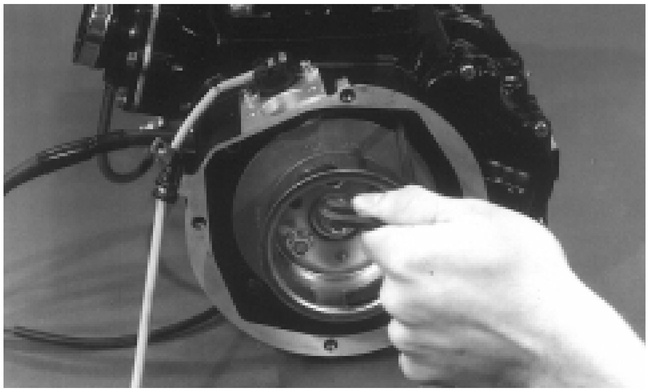
AQ074

36. Install the starter pulley and secure with three cap screws. Tighten to 0.8-1.2 kg-m (6-9 ft-lb).

37. Tighten the flywheel cap screw to 4 kg-m (29 ft-lb).

38. Install the magneto housing; then apply blue Loctite #242 to the four Allen-head cap screws and secure. Tighten to 1.8-2.2 kg-m (13-16 ft-lb).

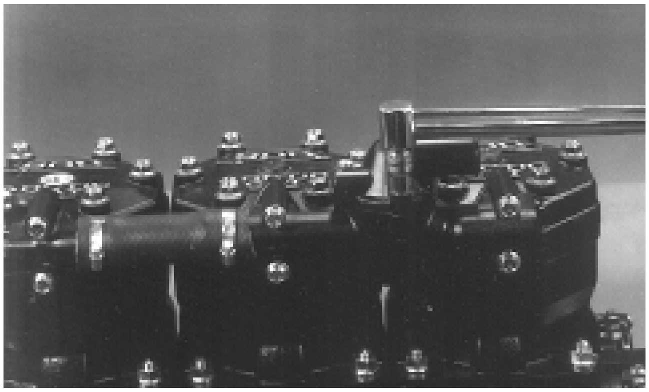
Fig. 2-423



AQ076

39. Install the thermostat with its rubber seal and thermostat cover. Secure with three cap screws. Tighten to 0.7-1 kg-m (5-7 ft-lb).

Fig. 2-424



AQ079

40. Cap the MAG-side impulse fitting. Secure with a clamp.

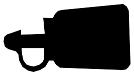
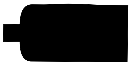
41. Pressure test the engine (see Section 3).

2

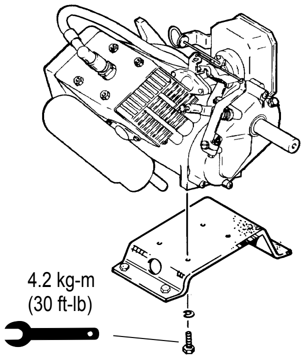
Assembly Schematics Table of Contents

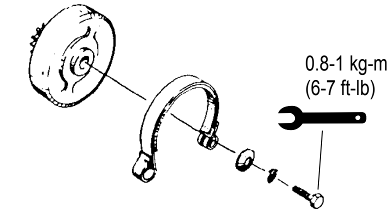
60 **c** 2-100
340 cc 2-101
370 & 440 cc F/C 2-102
440 cc L/C 2-104
500 & 600 cc 2-106
550 cc 2-108
580 cc 2-110
700 cc 2-112
600 cc Triple 2-114
800 & 1000 cc 2-116

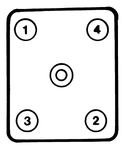
Listed in the table below are symbols indicating special instructions and other important information necessary for proper servicing. Please note the definition for each symbol. These symbols are used throughout this two-volume set.

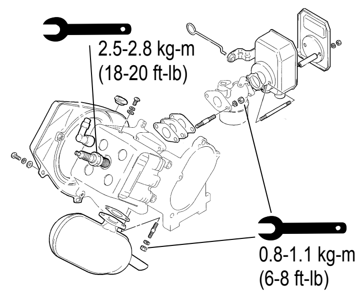
SYMBOL	DESCRIPTION
	Torque control required
	243 - apply blue Loctite #243 (p/n 1048-028) 270 - apply green Loctite #270 (p/n 1048-030)
	Lubricate with Arctic Cat 50:1 Injection Oil (p/n 0636-286)
	Lubricate with Arctic Cat Low Temp Grease (p/n 0636-593)
	3B - Three Bond Sealant (p/n 0636-070) HT - High-Temp Sealant (p/n 0636-069) AS - Anti-Seize Thread Compound (p/n 0678-146)

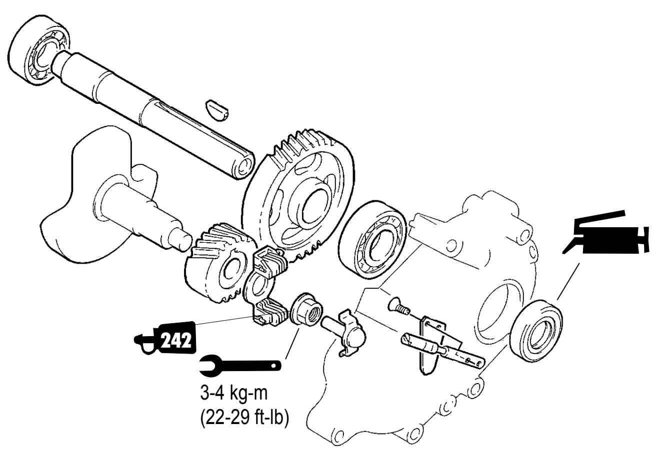
60 cc

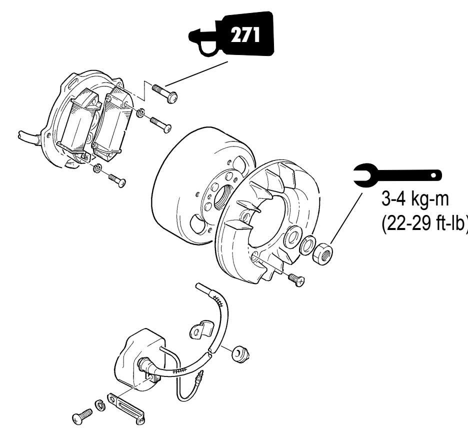

4.2 kg-m
(30 ft-lb)

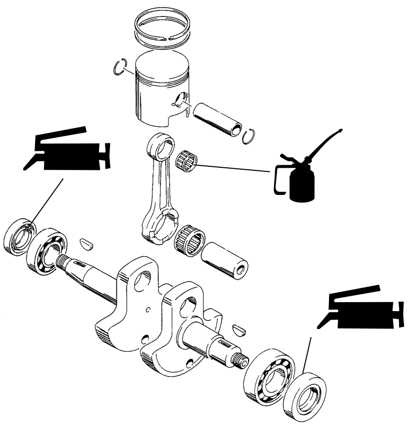

0.8-1 kg-m
(6-7 ft-lb)

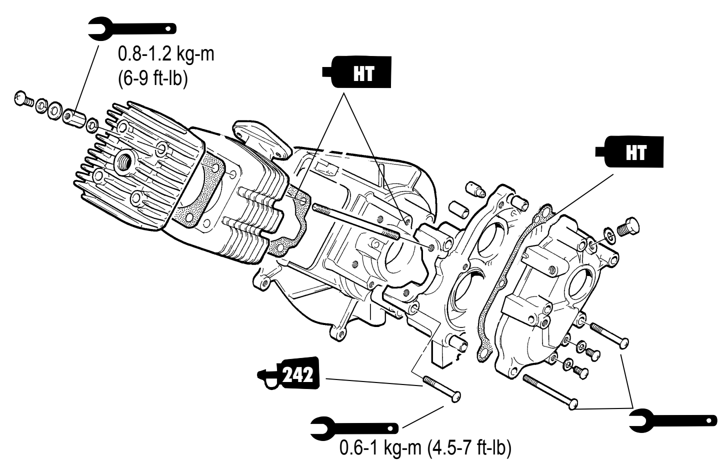

1
4
3
2


2.5-2.8 kg-m
(18-20 ft-lb)
0.8-1.1 kg-m
(6-8 ft-lb)

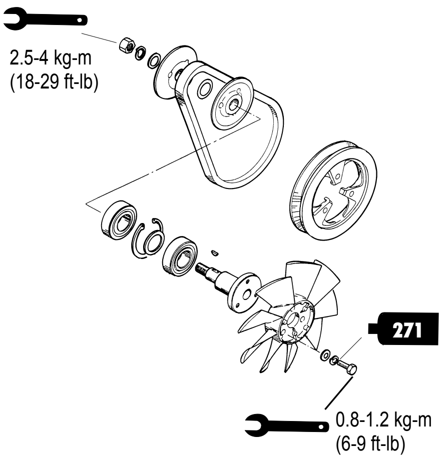

242
3-4 kg-m
(22-29 ft-lb)

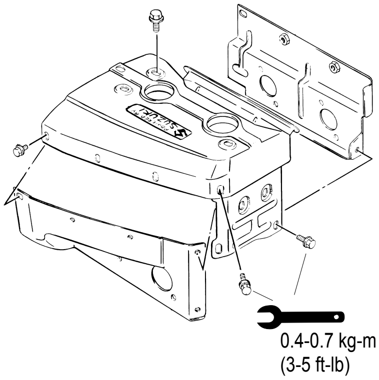

271
3-4 kg-m
(22-29 ft-lb)

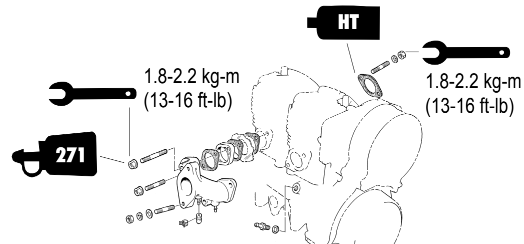


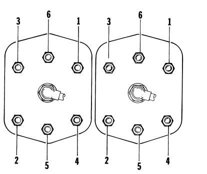

0.8-1.2 kg-m
(6-9 ft-lb)
HT
HT
242
0.6-1 kg-m (4.5-7 ft-lb)

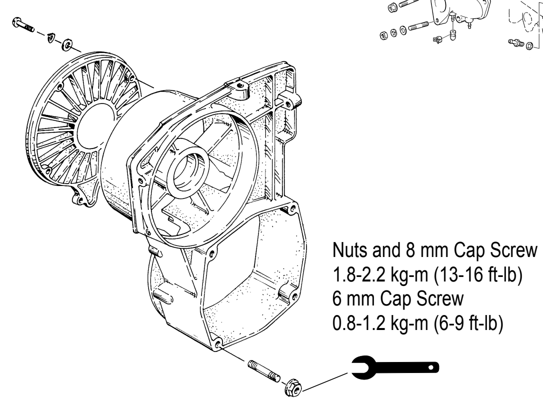
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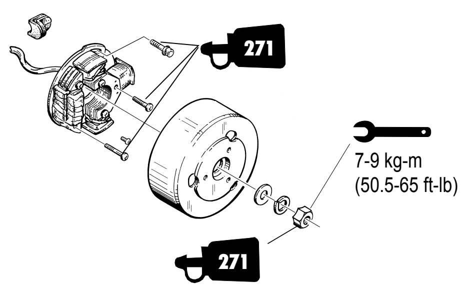

2.5-4 kg-m
(18-29 ft-lb)
271
0.8-1.2 kg-m
(6-9 ft-lb)

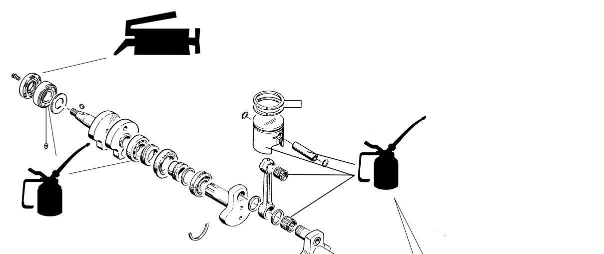

0.4-0.7 kg-m
(3-5 ft-lb)

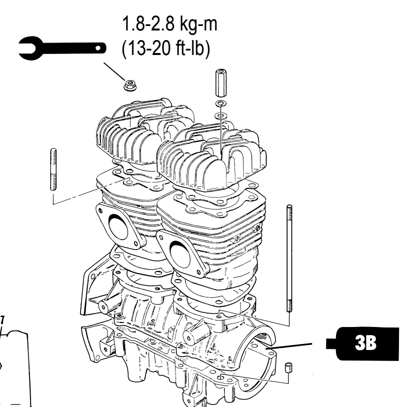

HT
1.8-2.2 kg-m
(13-16 ft-lb)
1.8-2.2 kg-m
(13-16 ft-lb)
271

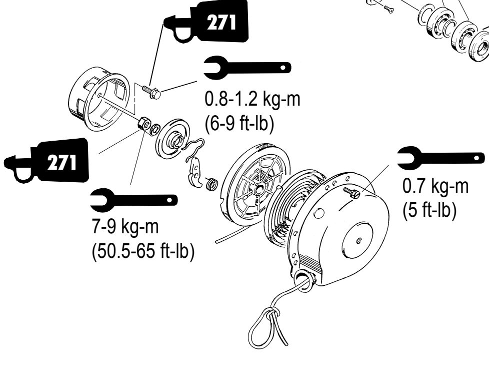

3 6 1 3 6 1
2 5 4 2 5 4
1.8-2.8 kg-m
(13-20 ft-lb)

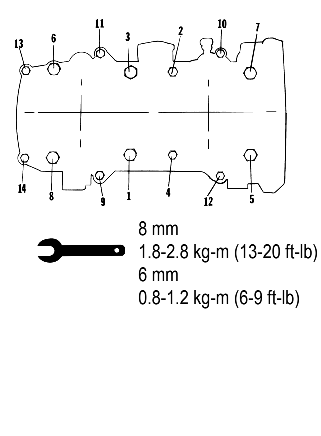

Nuts and 8 mm Cap Screw
1.8-2.2 kg-m (13-16 ft-lb)
6 mm Cap Screw
0.8-1.2 kg-m (6-9 ft-lb)


271
7-9 kg-m
(50.5-65 ft-lb)
271



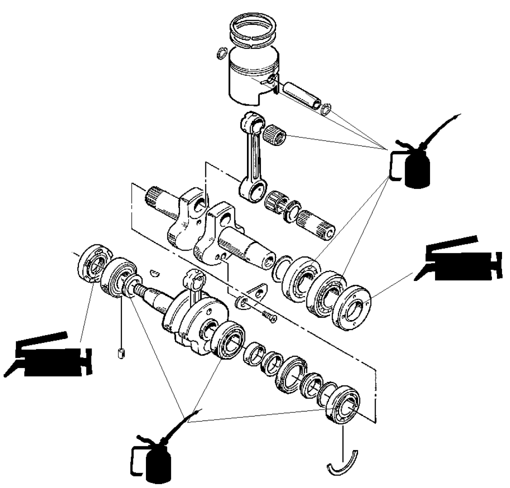

1.8-2.8 kg-m
(13-20 ft-lb)
3B

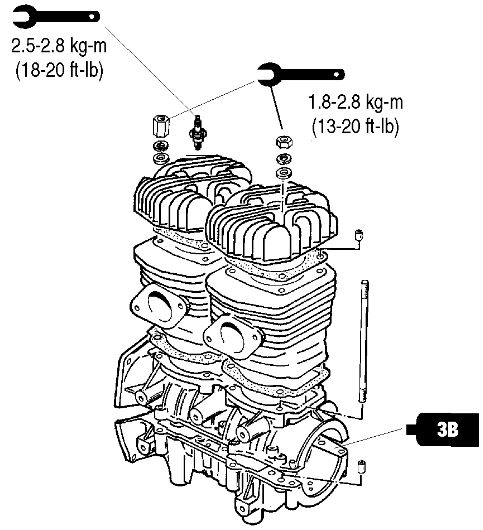

271
0.8-1.2 kg-m
(6-9 ft-lb)
271
7-9 kg-m
(50.5-65 ft-lb)
0.7 kg-m
(5 ft-lb)

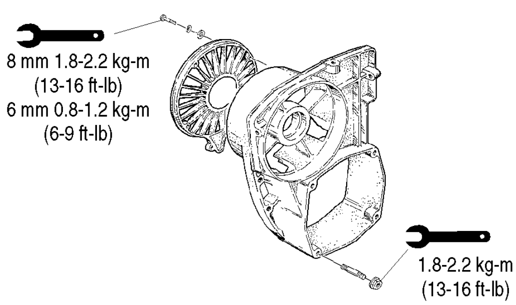

13 6 11 3 2 10 7
14 8 9 1 4 12 5
8 mm
1.8-2.8 kg-m (13-20 ft-lb)
6 mm
0.8-1.2 kg-m (6-9 ft-lb)

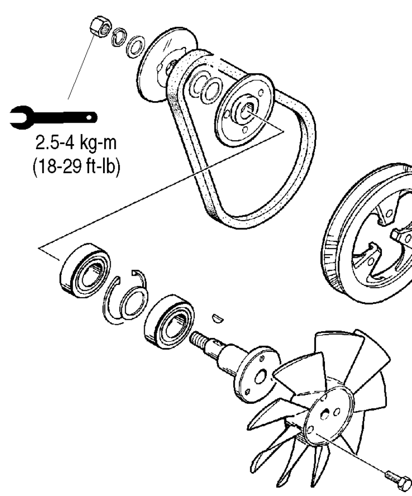
2

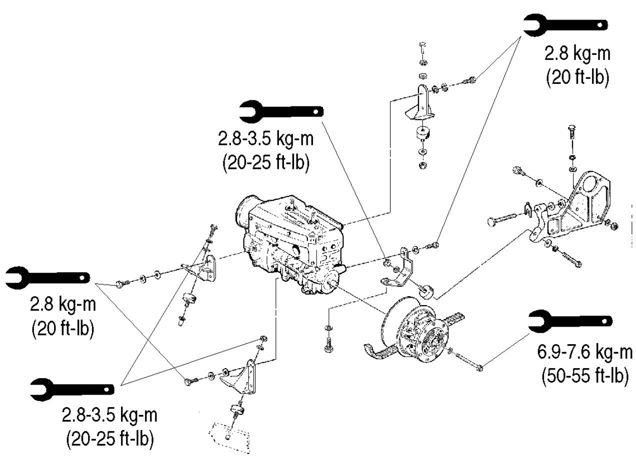
370 & 440 cc F/C

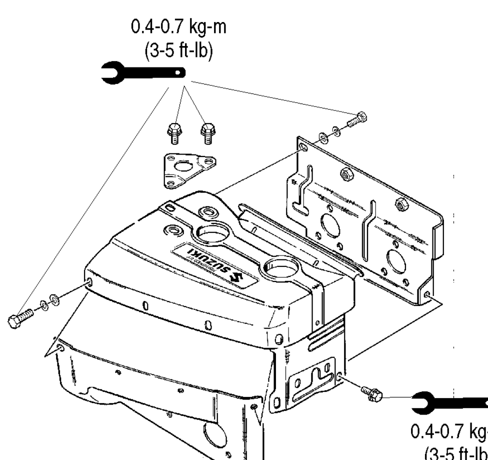


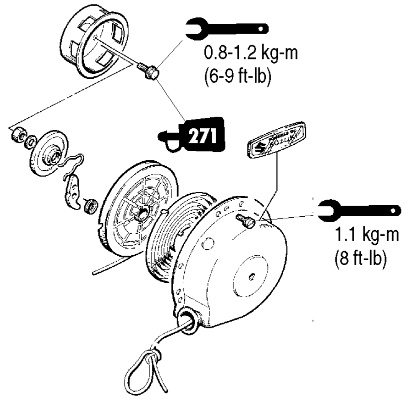

2.5-2.8 kg-m
(18-20 ft-lb)
1.8-2.8 kg-m
(13-20 ft-lb)
3B

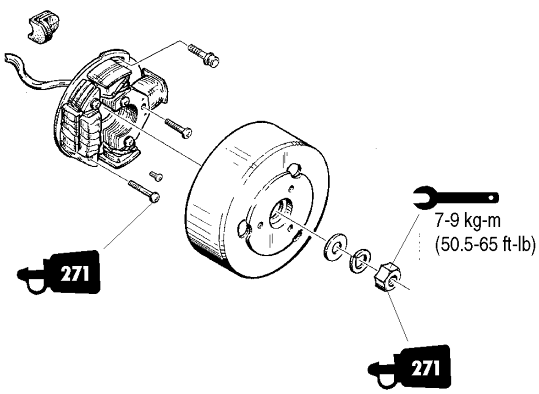

8 mm 1.8-2.2 kg-m
(13-16 ft-lb)
6 mm 0.8-1.2 kg-m
(6-9 ft-lb)
1.8-2.2 kg-m
(13-16 ft-lb)

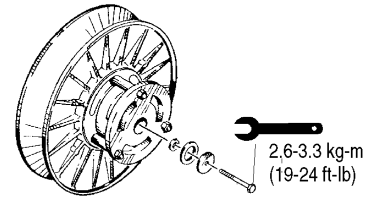

2.5-4 kg-m
(18-29 ft-lb)


2.8 kg-m
(20 ft-lb)
2.8-3.5 kg-m
(20-25 ft-lb)
2.8 kg-m
(20 ft-lb)
2.8-3.5 kg-m
(20-25 ft-lb)
6.9-7.6 kg-m
(50-55 ft-lb)

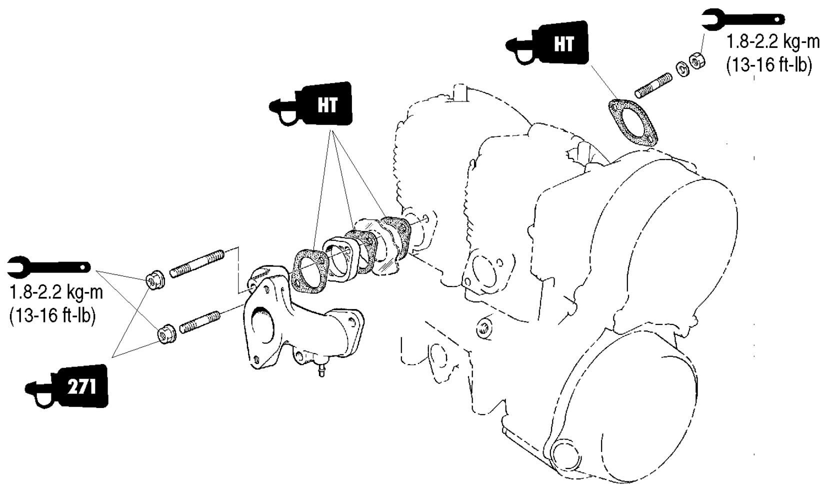

0.4-0.7 kg-m
(3-5 ft-lb)
0.4-0.7 kg-m
(3-5 ft-lb)

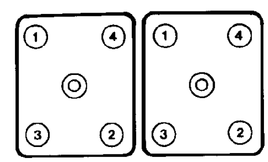

0.8-1.2 kg-m
(6-9 ft-lb)
271
1.1 kg-m
(8 ft-lb)

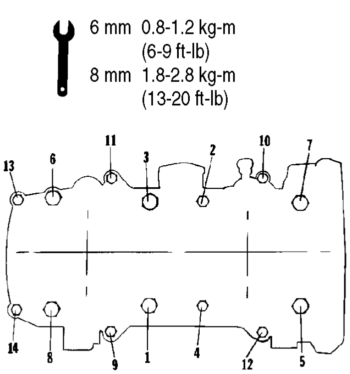

7-9 kg-m
(50.5-65 ft-lb)
271
271

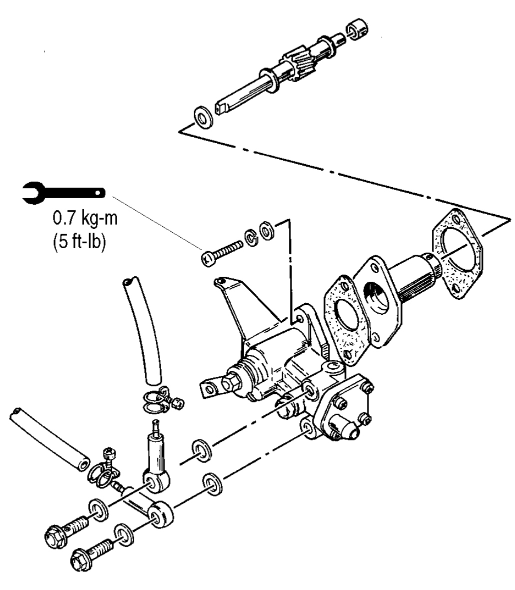

2,6-3.3 kg-m
(19-24 ft-lb)

2

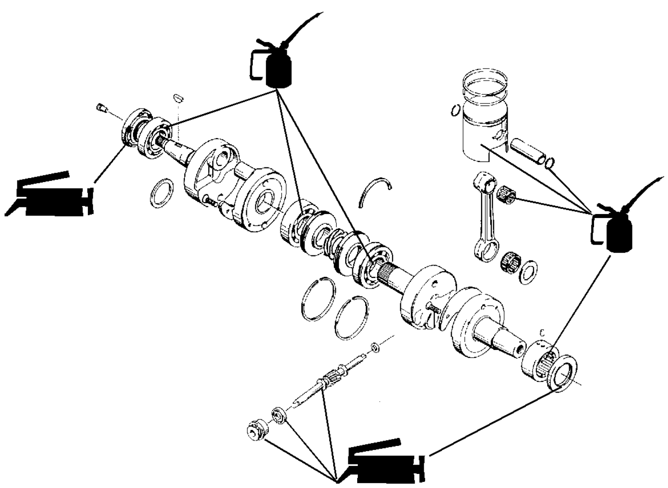

HT
1.8-2.2 kg-m
(13-16 ft-lb)
HT
1.8-2.2 kg-m
(13-16 ft-lb)
271

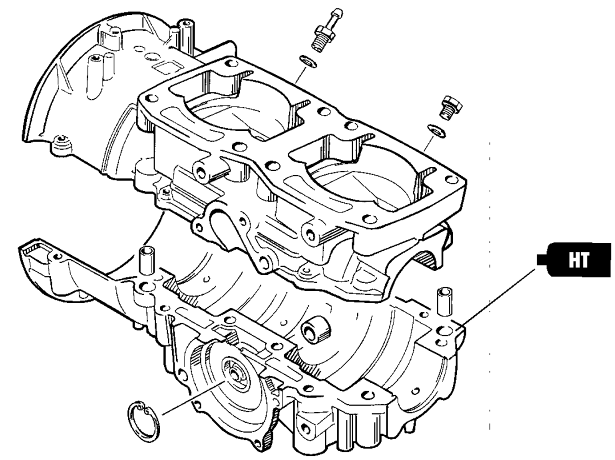

1
4
3
2
1
4
3
2


6 mm 0.8-1.2 kg-m
(6-9 ft-lb)
8 mm 1.8-2.8 kg-m
(13-20 ft-lb)
13
6
11
3
2
10
7
14
8
9
1
4
12
5

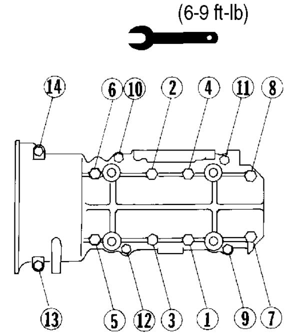

0.7 kg-m
(5 ft-lb)

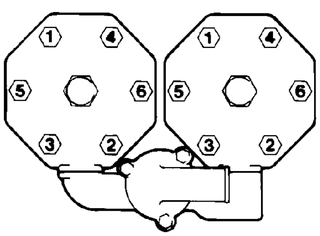
440 cc L/C

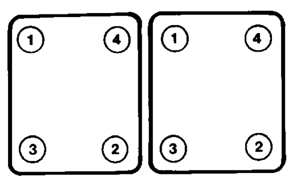


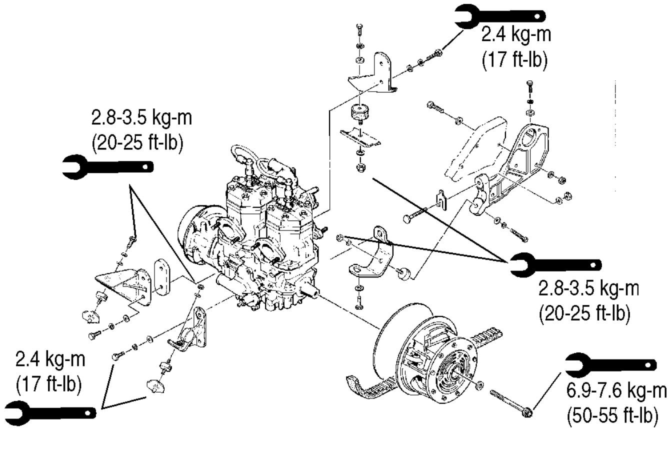


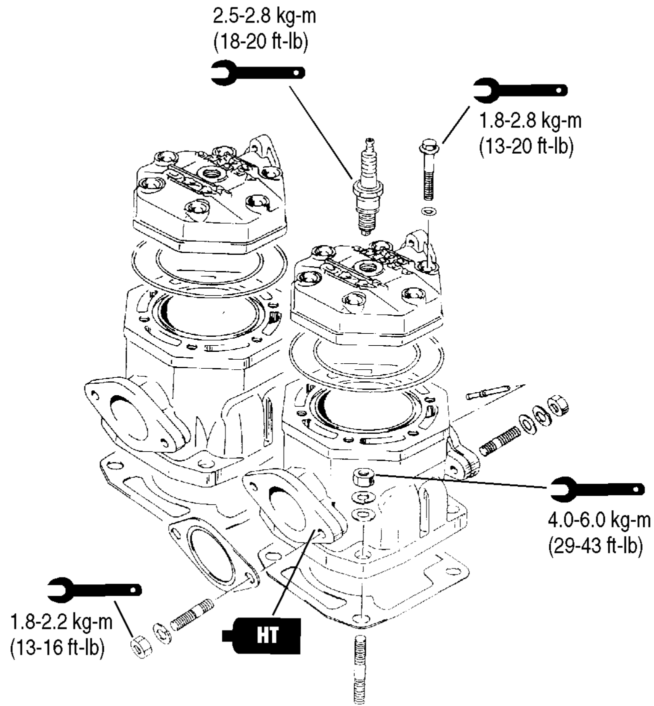
8 mm 1.8-2.8 kg-m
(13-20 ft-lb)
6 mm 0.8-1.2 kg-m
(6-9 ft-lb)



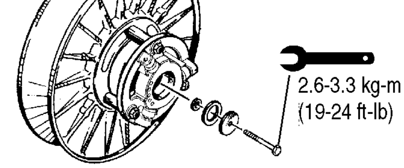






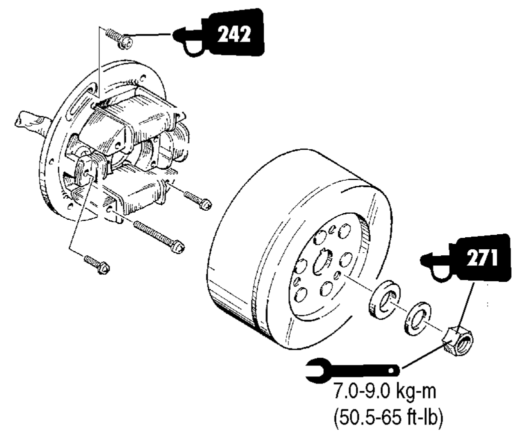


2.5-2.8 kg-m
(18-20 ft-lb)
1.8-2.8 kg-m
(13-20 ft-lb)
4.0-6.0 kg-m
(29-43 ft-lb)
1.8-2.2 kg-m
(13-16 ft-lb)
HT

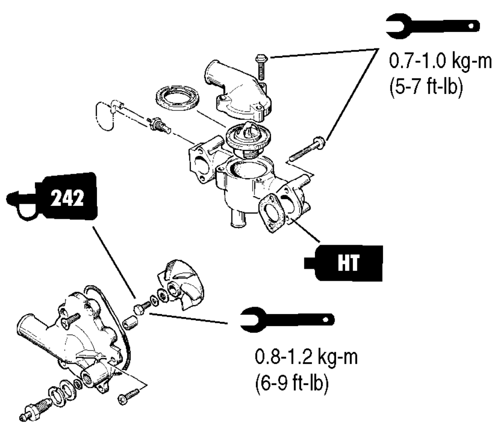


2.6-3.3 kg-m
(19-24 ft-lb)

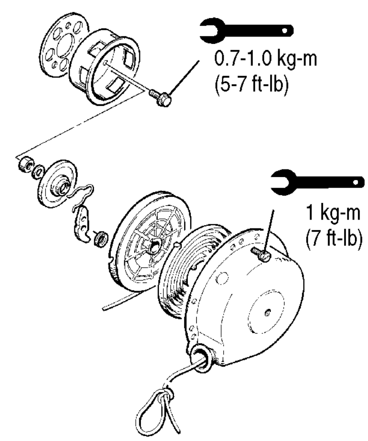
2



242
271
7.0-9.0 kg-m
(50.5-65 ft-lb)

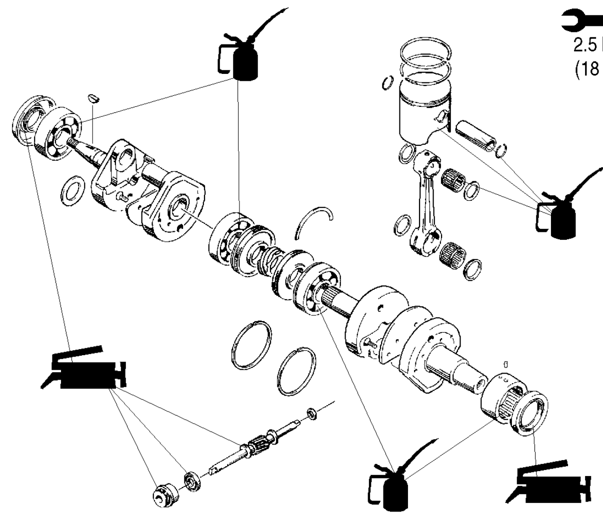


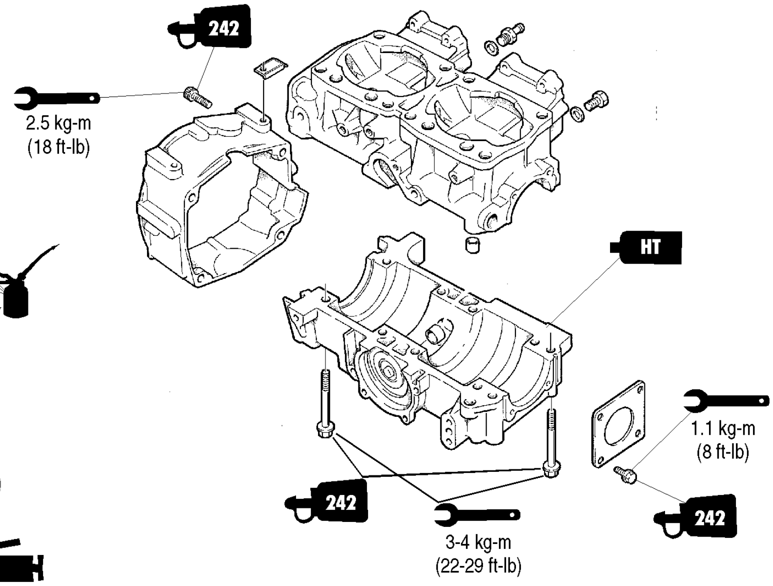
0.7-1.0 kg-m
(5-7 ft-lb)
242
HT
0.8-1.2 kg-m
(6-9 ft-lb)

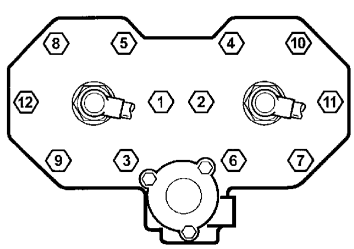


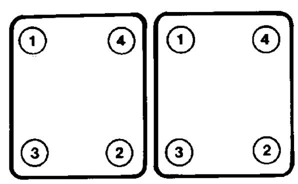
0.7-1.0 kg-m
(5-7 ft-lb)
1 kg-m
(7 ft-lb)

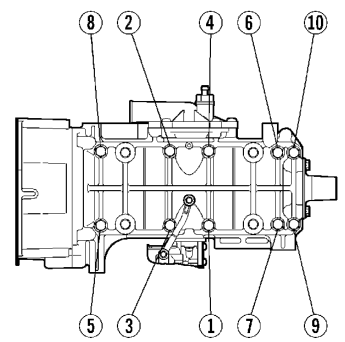
500 & 600 cc



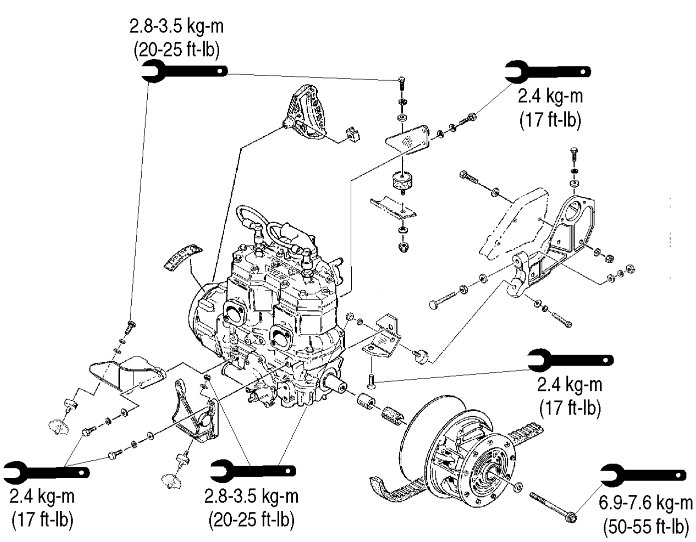

242
2.5 kg-m
(18 ft-lb)
HT
1.1 kg-m
(8 ft-lb)
242
3-4 kg-m
(22-29 ft-lb)
242

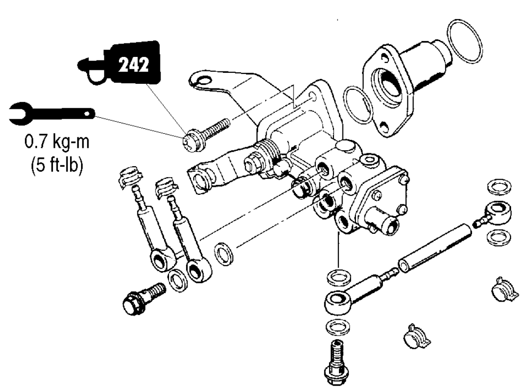

8 5 4 10
12 1 2 11
9 3 6 7

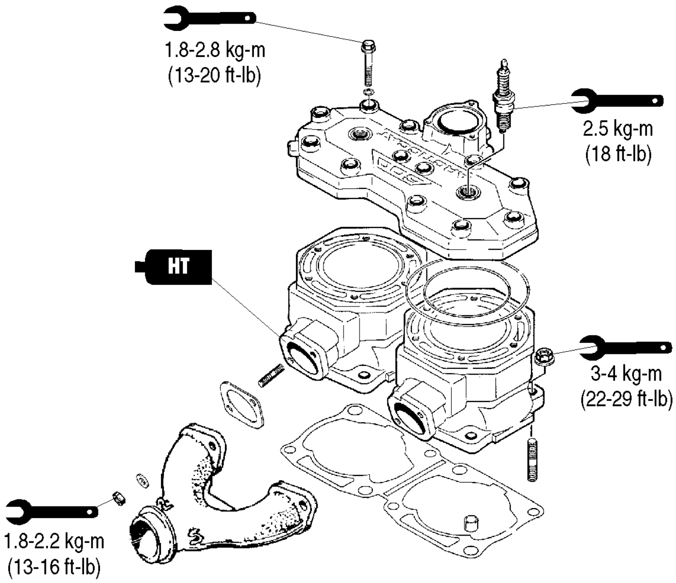

1 4
3 2
1 4
3 2

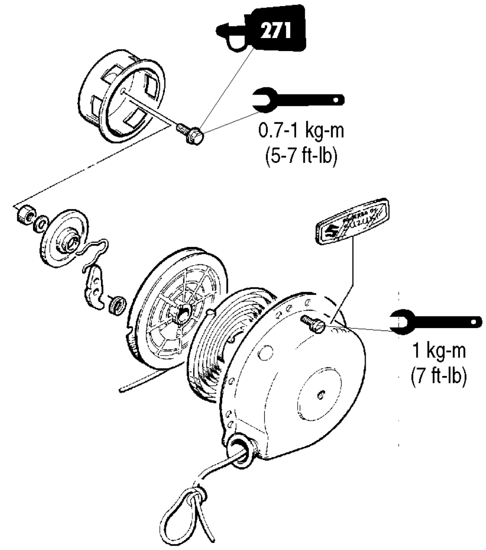

8 2 4 6 10
5 3 1 7 9

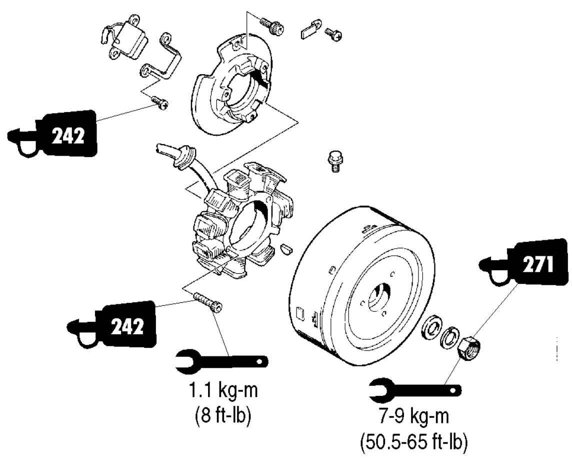
2

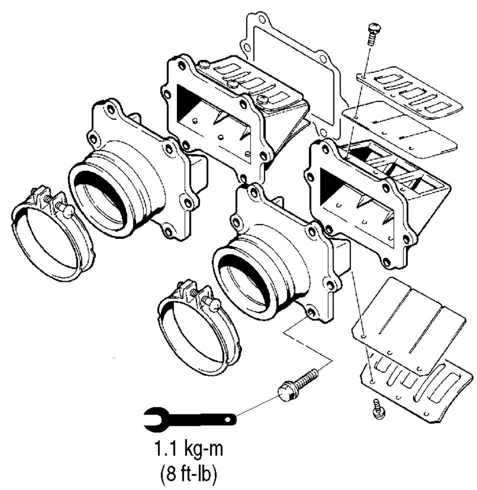

2.8-3.5 kg-m
(20-25 ft-lb)
2.4 kg-m
(17 ft-lb)
2.4 kg-m
(17 ft-lb)
2.4 kg-m
(17 ft-lb)
2.8-3.5 kg-m
(20-25 ft-lb)
6.9-7.6 kg-m
(50-55 ft-lb)

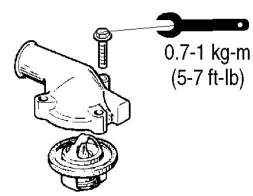

242
0.7 kg-m
(5 ft-lb)

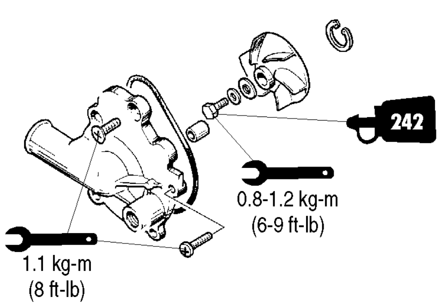

1.8-2.8 kg-m
(13-20 ft-lb)
2.5 kg-m
(18 ft-lb)
HT
3-4 kg-m
(22-29 ft-lb)
1.8-2.2 kg-m
(13-16 ft-lb)

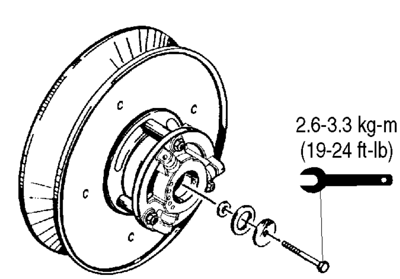

271
0.7-1 kg-m
(5-7 ft-lb)
1 kg-m
(7 ft-lb)


242
271
242
1.1 kg-m
(8 ft-lb)
7-9 kg-m
(50.5-65 ft-lb)

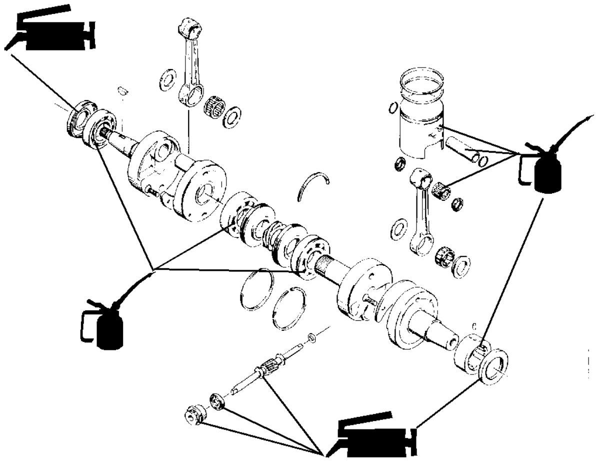

1.1 kg-m
(8 ft-lb)

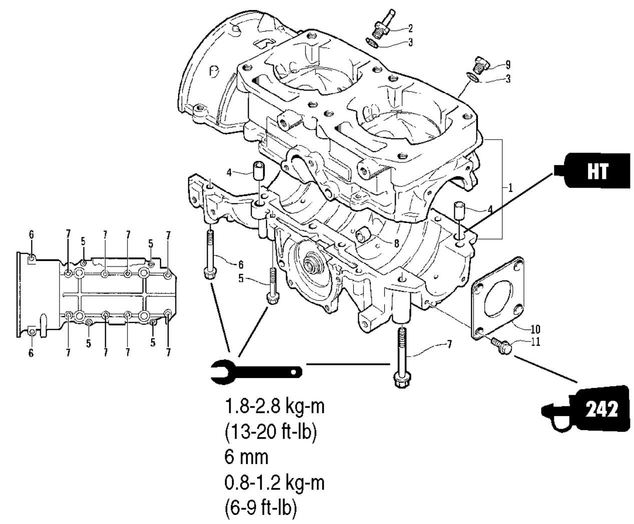

0.7-1 kg-m
(5-7 ft-lb)

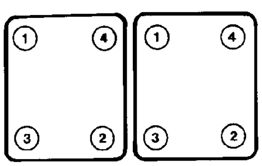

242
0.8-1.2 kg-m
(6-9 ft-lb)
1.1 kg-m
(8 ft-lb)

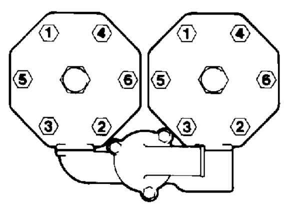

2.6-3.3 kg-m
(19-24 ft-lb)

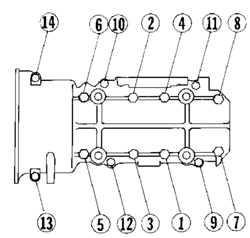
550 cc

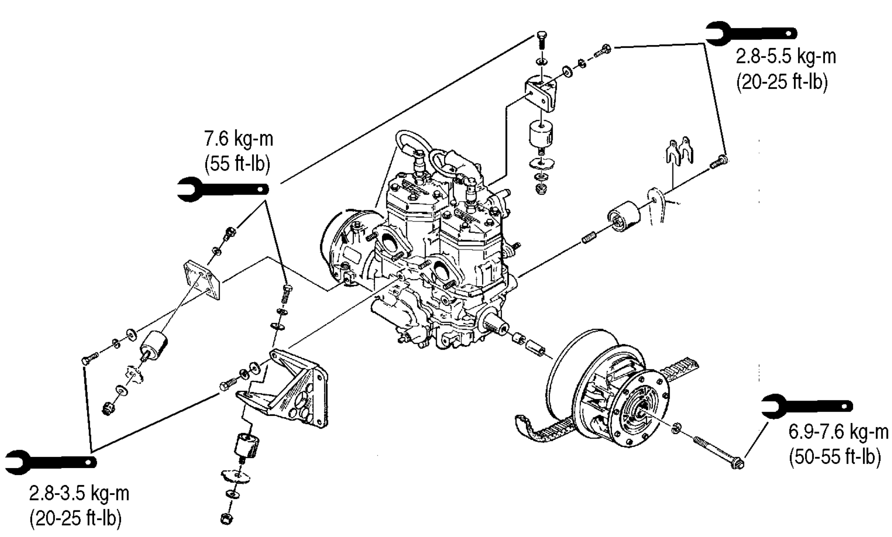


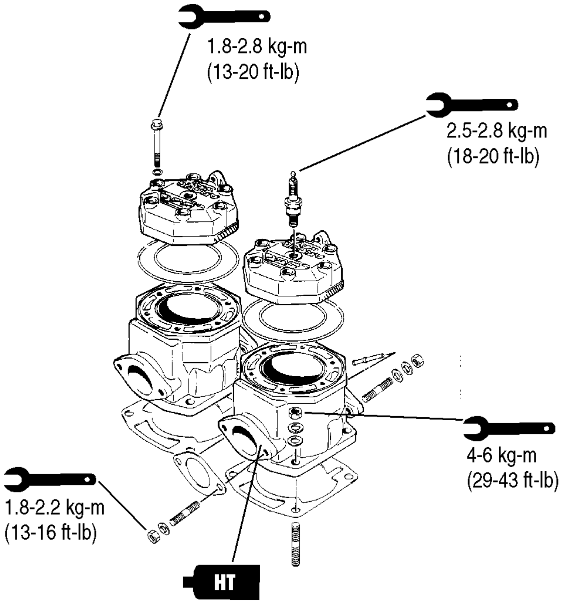

HT
242
1.8-2.8 kg-m
(13-20 ft-lb)
6 mm
0.8-1.2 kg-m
(6-9 ft-lb)

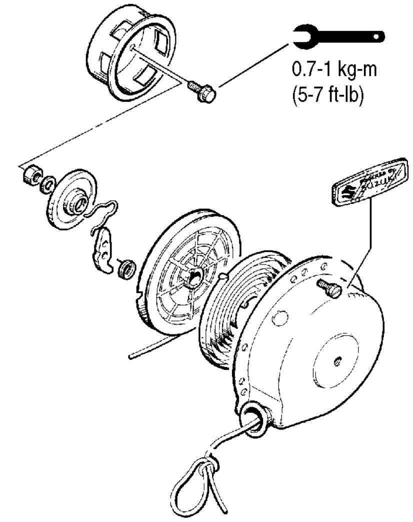


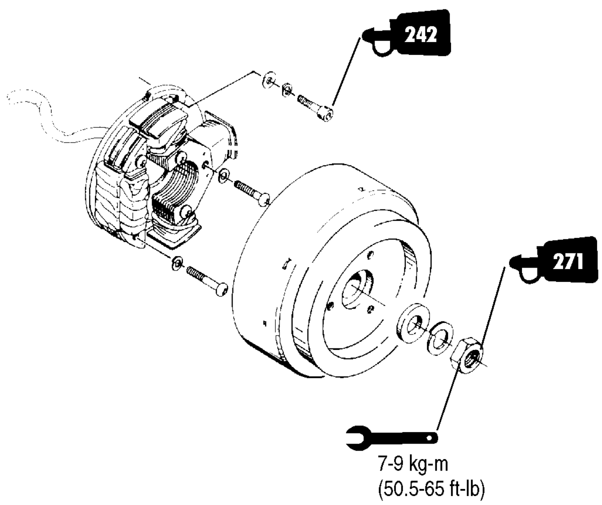


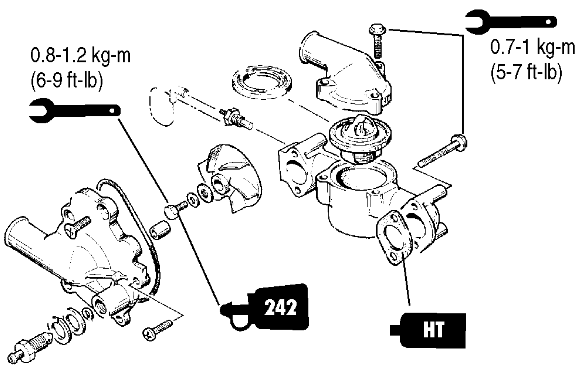


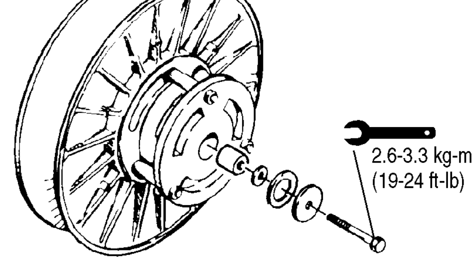

2.8-5.5 kg-m
(20-25 ft-lb)
7.6 kg-m
(55 ft-lb)
6.9-7.6 kg-m
(50-55 ft-lb)
2.8-3.5 kg-m
(20-25 ft-lb)


1.8-2.8 kg-m
(13-20 ft-lb)
2.5-2.8 kg-m
(18-20 ft-lb)
4-6 kg-m
(29-43 ft-lb)
1.8-2.2 kg-m
(13-16 ft-lb)
HT


0.7-1 kg-m
(5-7 ft-lb)

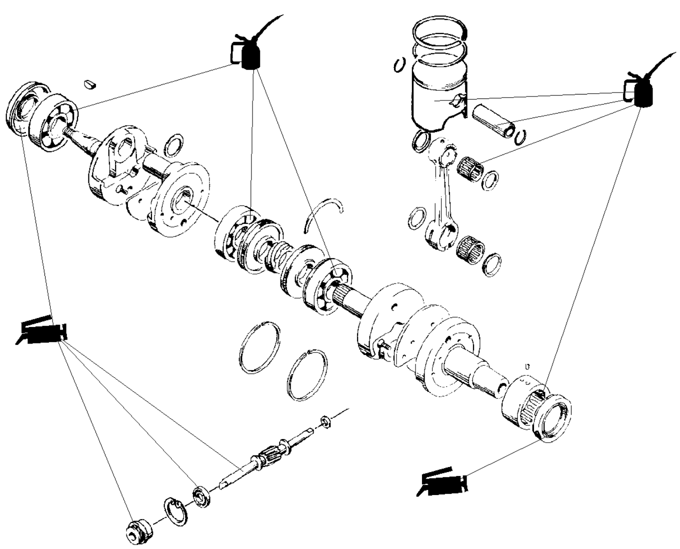

242
271
7-9 kg-m
(50.5-65 ft-lb)

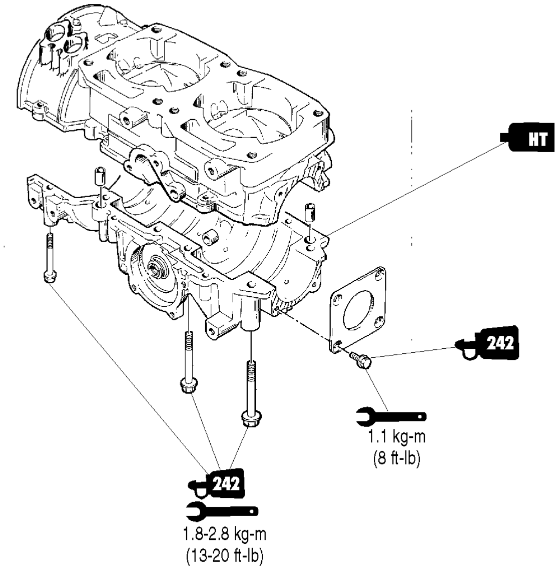

0.8-1.2 kg-m
(6-9 ft-lb)
0.7-1 kg-m
(5-7 ft-lb)
242
HT

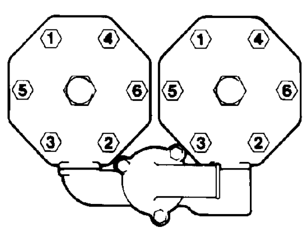

2.6-3.3 kg-m
(19-24 ft-lb)

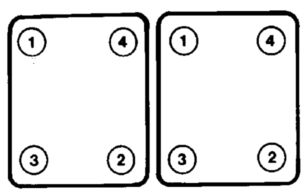
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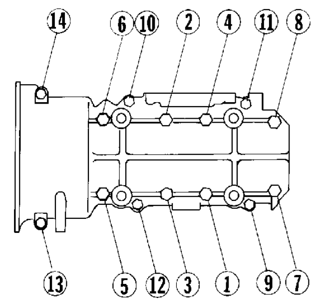
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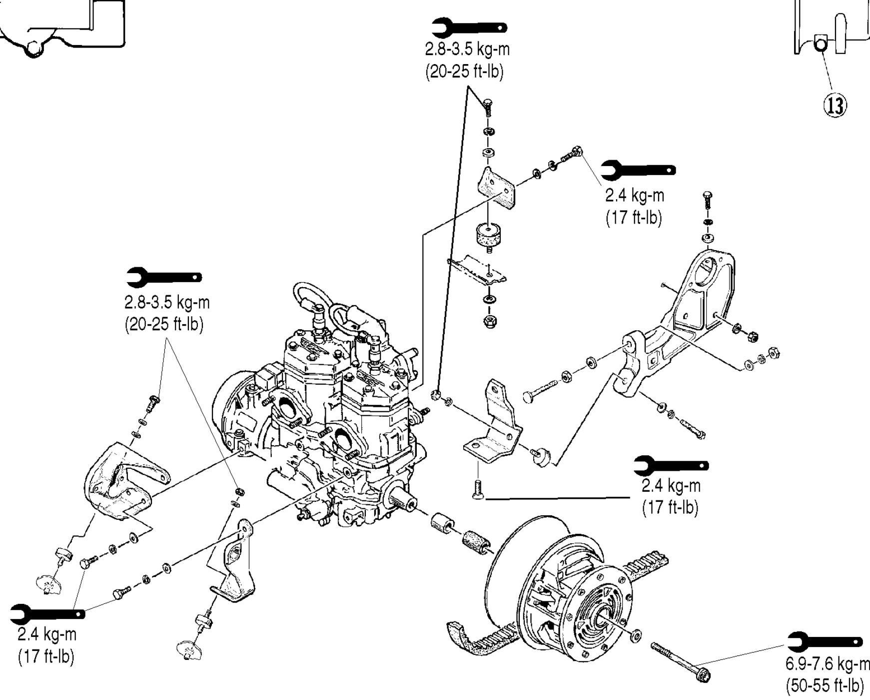


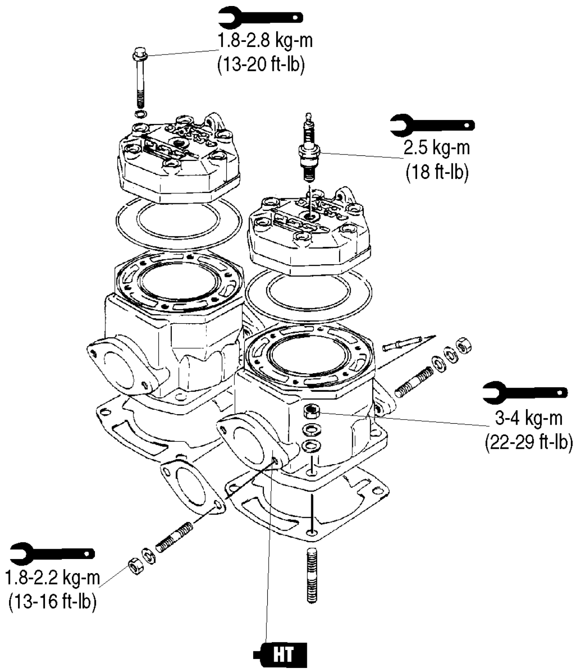

HT
242
1.1 kg-m
(8 ft-lb)
242
1.8-2.8 kg-m
(13-20 ft-lb)

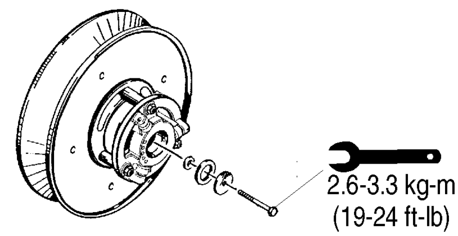

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5 6
3 2
1 4
5 6
3 2


1 4
3 2
1 4
3 2

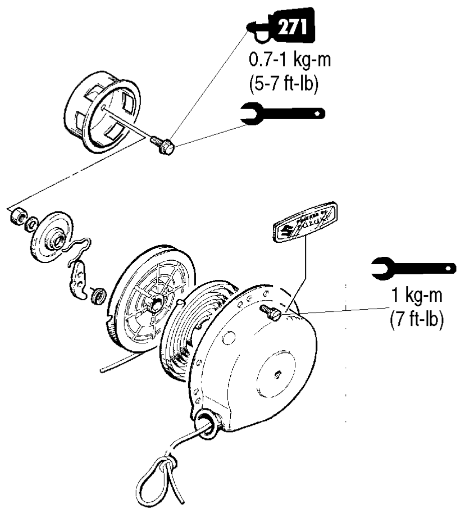

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13 5 12 3 1 9 7

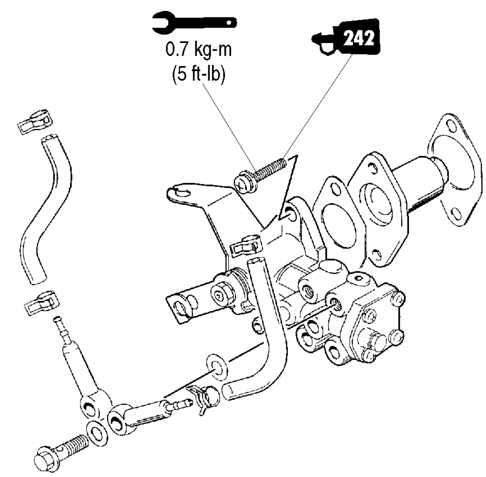

2.8-3.5 kg-m
(20-25 ft-lb)
2.4 kg-m
(17 ft-lb)
2.8-3.5 kg-m
(20-25 ft-lb)
2.4 kg-m
(17 ft-lb)
2.4 kg-m
(17 ft-lb)
6.9-7.6 kg-m
(50-55 ft-lb)

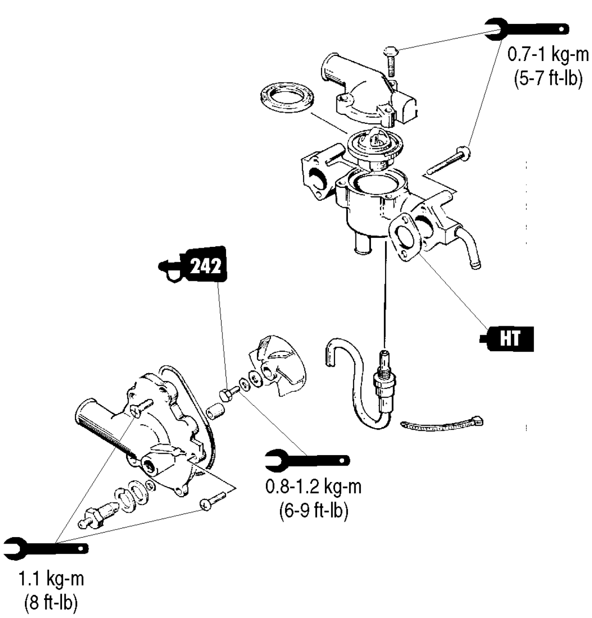

1.8-2.8 kg-m
(13-20 ft-lb)
2.5 kg-m
(18 ft-lb)
3-4 kg-m
(22-29 ft-lb)
1.8-2.2 kg-m
(13-16 ft-lb)
HT

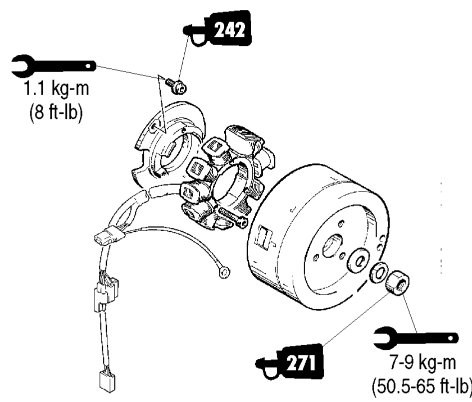

2.6-3.3 kg-m
(19-24 ft-lb)

2

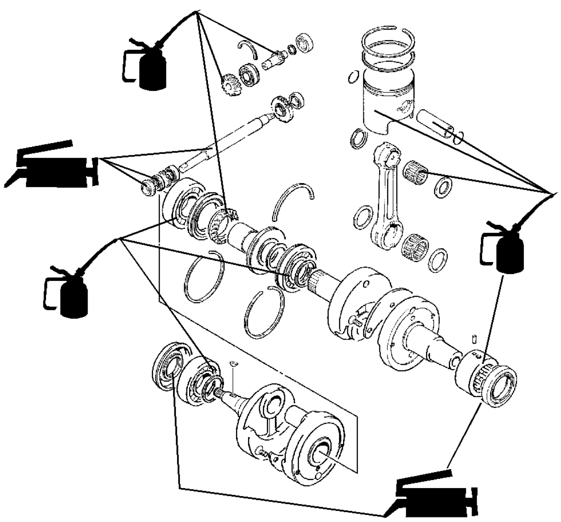

271
0.7-1 kg-m
(5-7 ft-lb)
1 kg-m
(7 ft-lb)

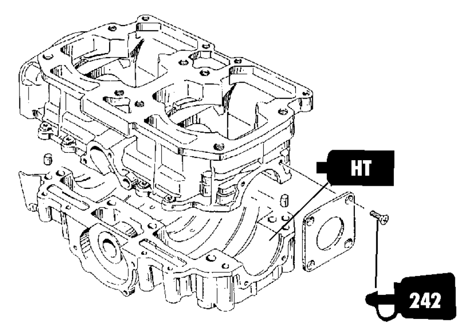

0.7 kg-m
(5 ft-lb)
242

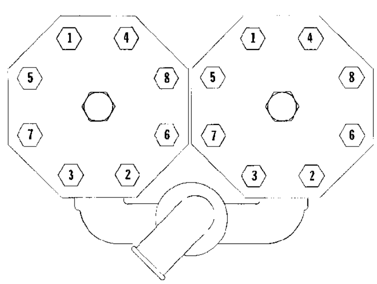

0.7-1 kg-m
(5-7 ft-lb)
242
HT
0.8-1.2 kg-m
(6-9 ft-lb)
1.1 kg-m
(8 ft-lb)

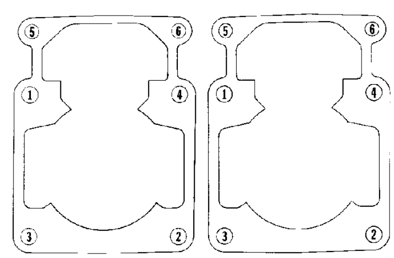

242
1.1 kg-m
(8 ft-lb)
271
7-9 kg-m
(50.5-65 ft-lb)

700 cc

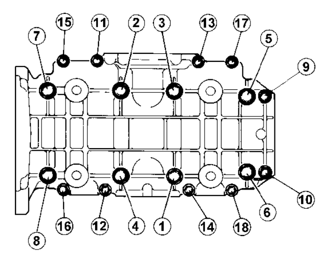


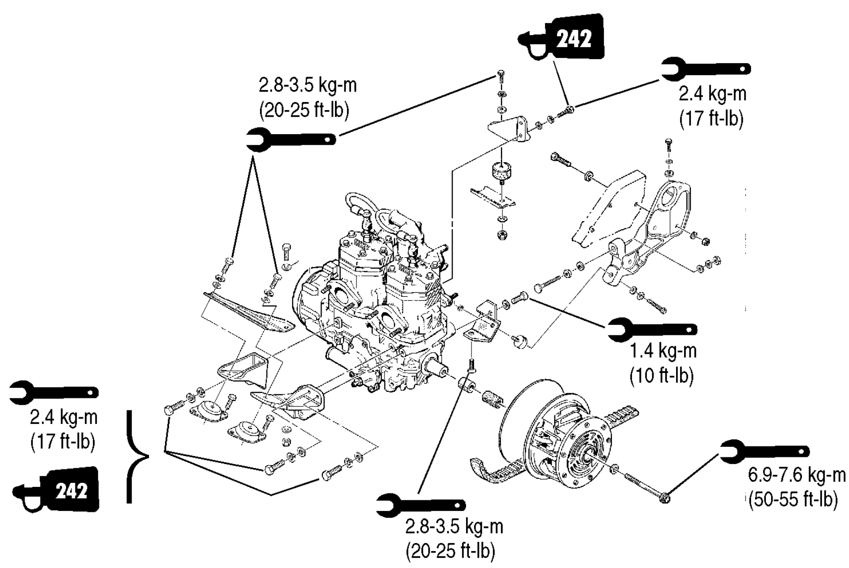


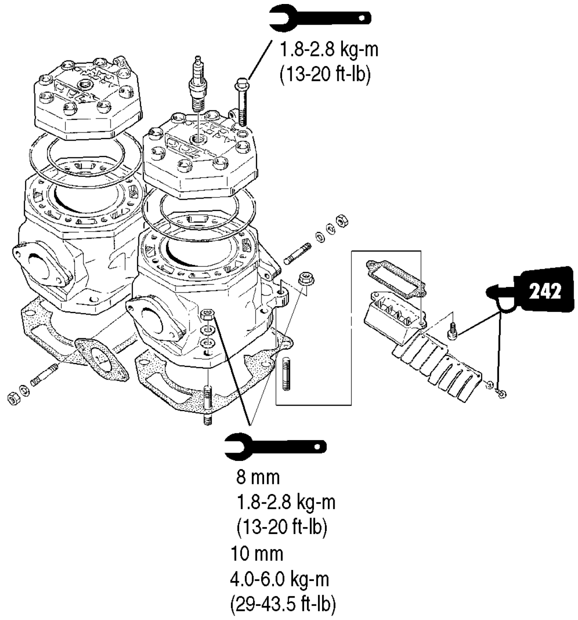


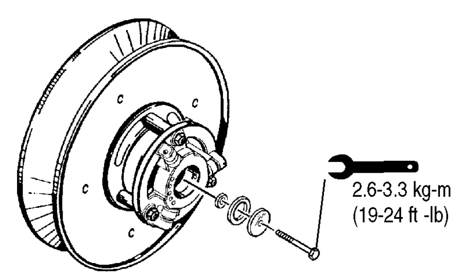


10 mm 4-6 kg-m (29-43 ft-lb)
8 mm 1.8-2.9 kg-m (13-20 ft-lb)
6 mm 0.8-1.2 kg-m (6-9 ft-lb)

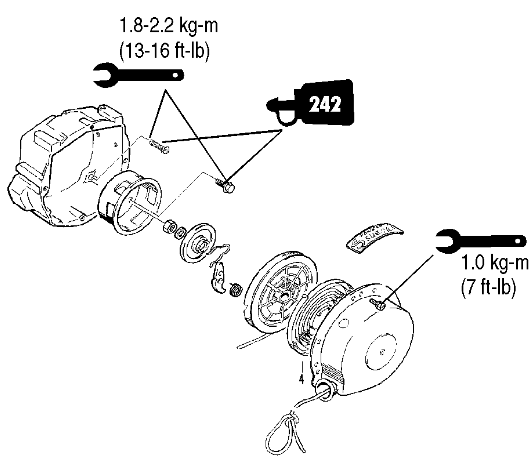


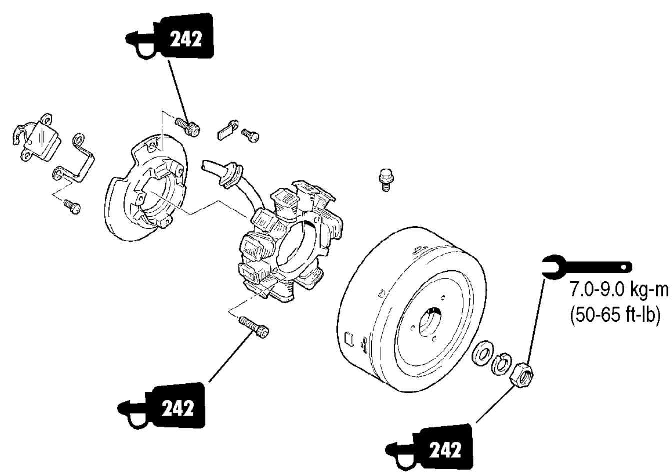


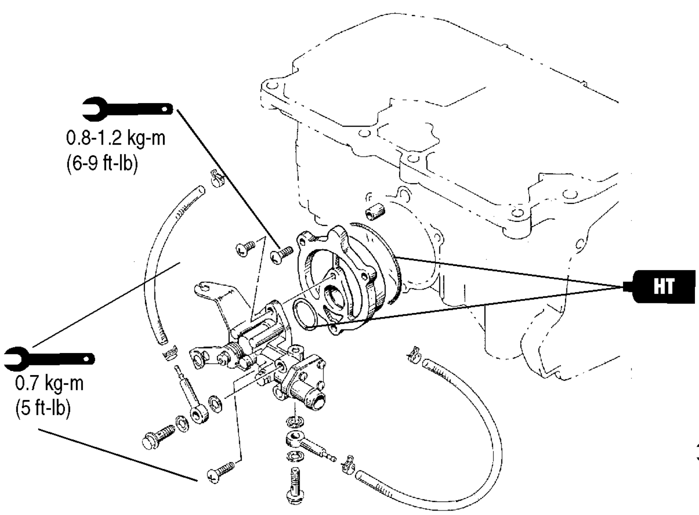

1.8-2.8 kg-m
(13-20 ft-lb)
242
8 mm
1.8-2.8 kg-m
(13-20 ft-lb)
10 mm
4.0-6.0 kg-m
(29-43.5 ft-lb)

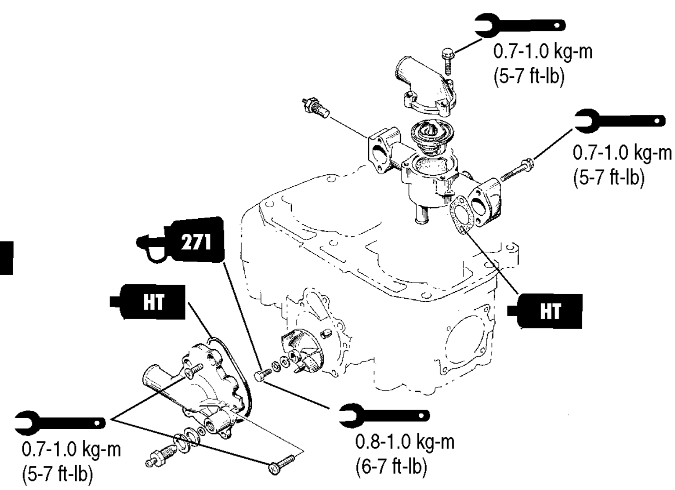

2.6-3.3 kg-m
(19-24 ft -lb)

2


1.8-2.2 kg-m
(13-16 ft-lb)
242
1.0 kg-m
(7 ft-lb)

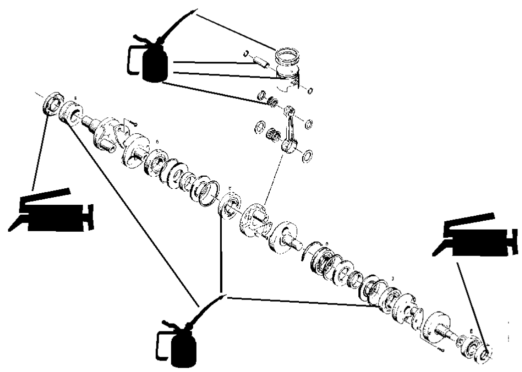

242
7.0-9.0 kg-m
(50-65 ft-lb)
242
242

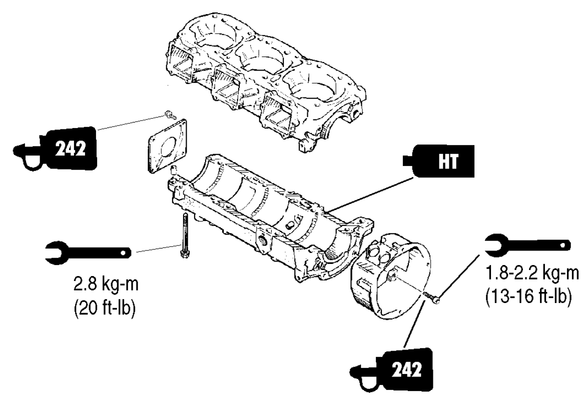

0.8-1.2 kg-m
(6-9 ft-lb)
HT
0.7 kg-m
(5 ft-lb)

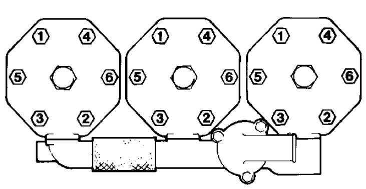

0.7-1.0 kg-m
(5-7 ft-lb)
0.7-1.0 kg-m
(5-7 ft-lb)
271
HT
HT
0.7-1.0 kg-m
(5-7 ft-lb)
0.8-1.0 kg-m
(6-7 ft-lb)

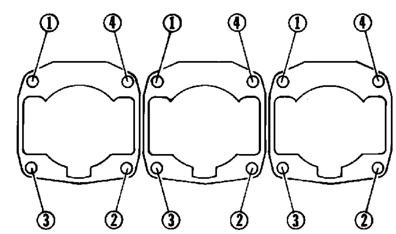
600 cc

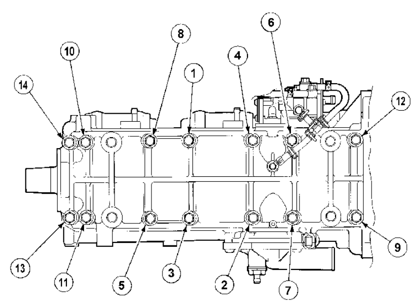
3 CYLINDER

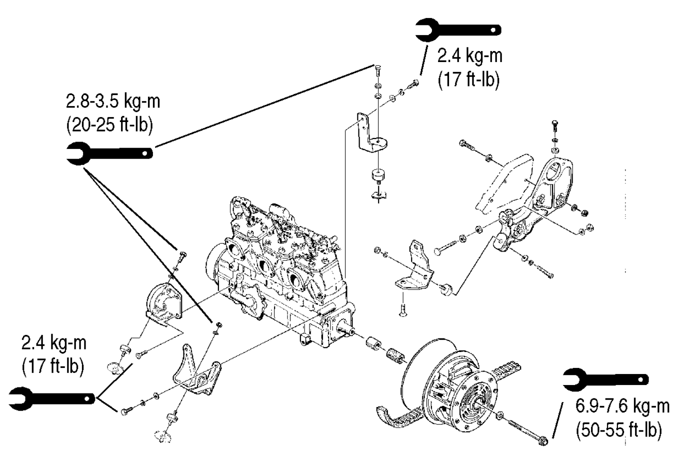


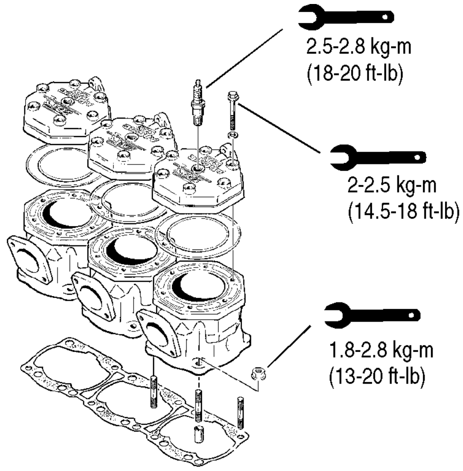


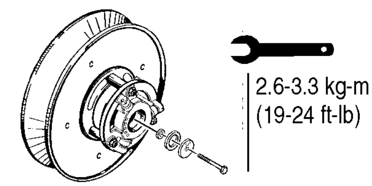




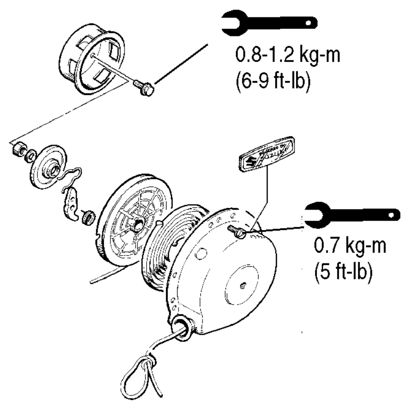


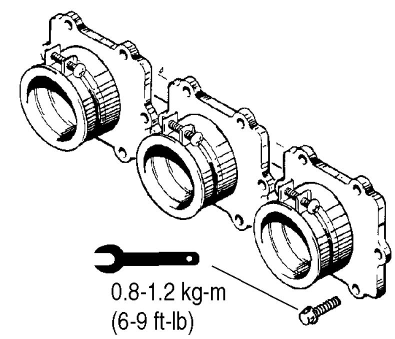


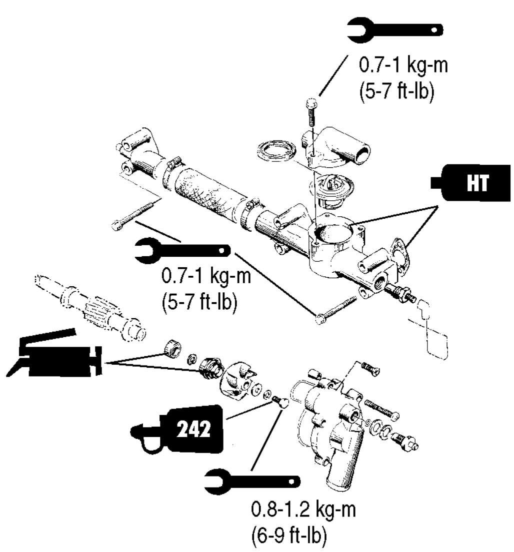

2.5-2.8 kg-m
(18-20 ft-lb)
2-2.5 kg-m
(14.5-18 ft-lb)
1.8-2.8 kg-m
(13-20 ft-lb)

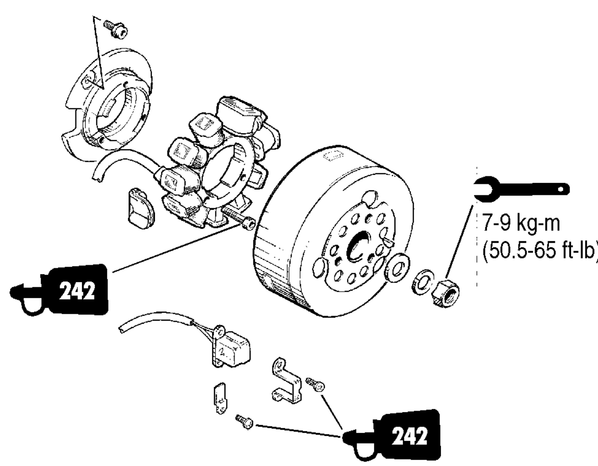

2.6-3.3 kg-m
(19-24 ft-lb)

2

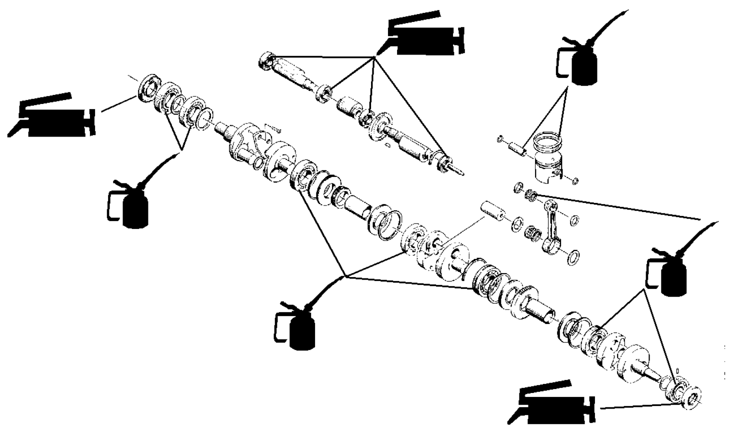

0.8-1.2 kg-m
(6-9 ft-lb)
0.7 kg-m
(5 ft-lb)

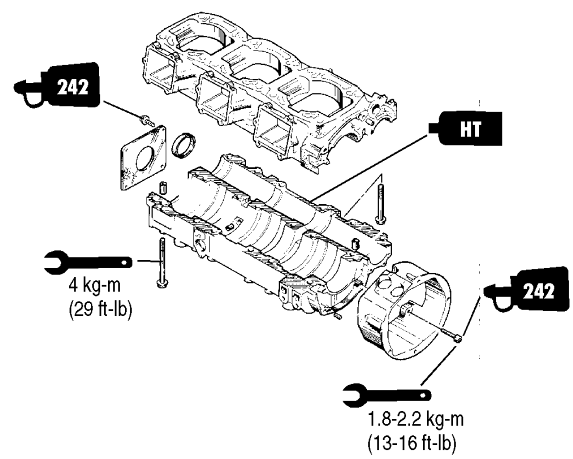

0.8-1.2 kg-m
(6-9 ft-lb)


0.7-1 kg-m
(5-7 ft-lb)
HT
0.7-1 kg-m
(5-7 ft-lb)
242
0.8-1.2 kg-m
(6-9 ft-lb)

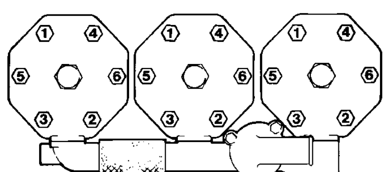

7-9 kg-m
(50.5-65 ft-lb)
242
242

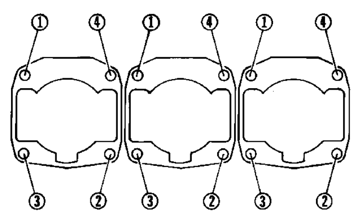
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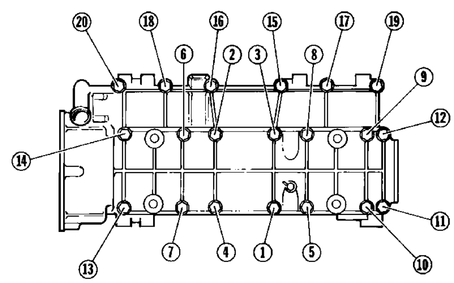


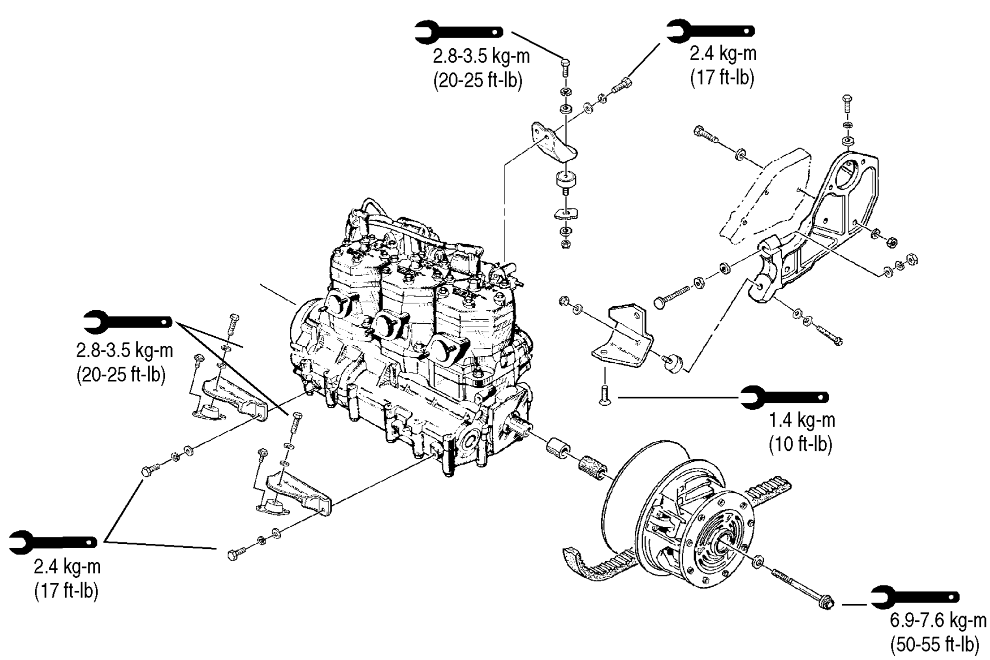


242
HT
4 kg-m
(29 ft-lb)
242
1.8-2.2 kg-m
(13-16 ft-lb)

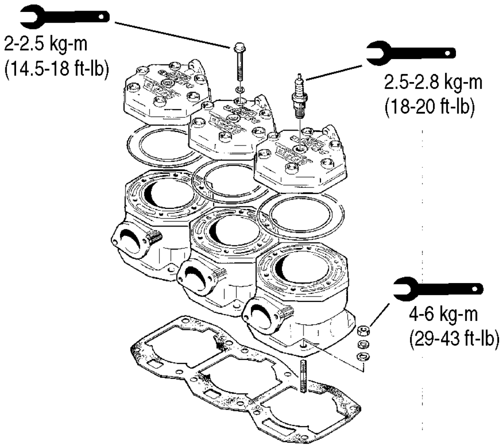


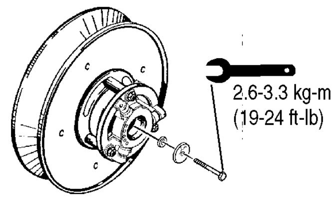


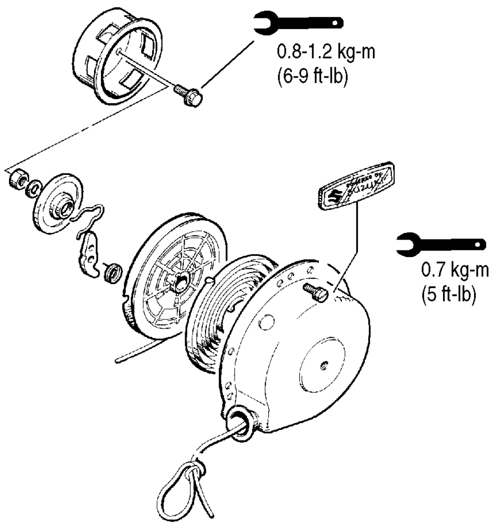


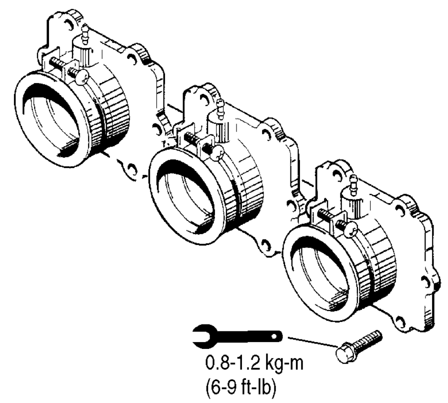


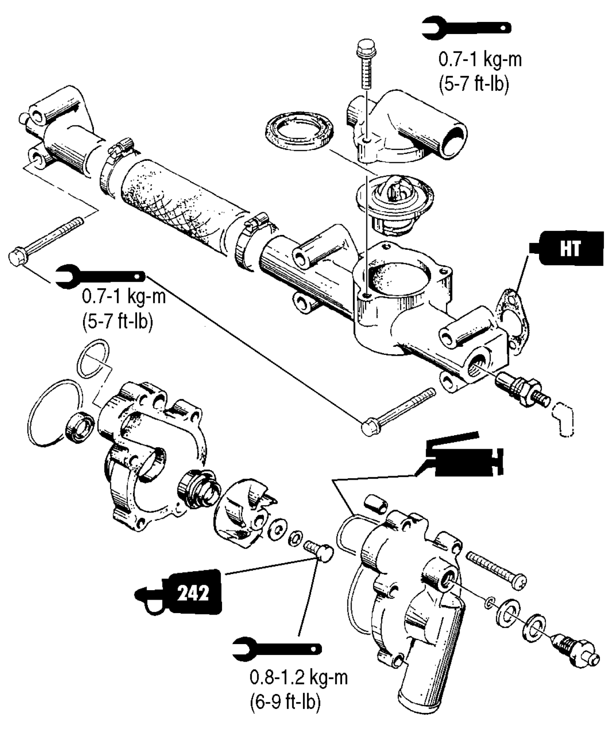
2.8-3.5 kg-m
(20-25 ft-lb)
2.4 kg-m
(17 ft-lb)
2.8-3.5 kg-m
(20-25 ft-lb)
1.4 kg-m
(10 ft-lb)
2.4 kg-m
(17 ft-lb)
6.9-7.6 kg-m
(50-55 ft-lb)

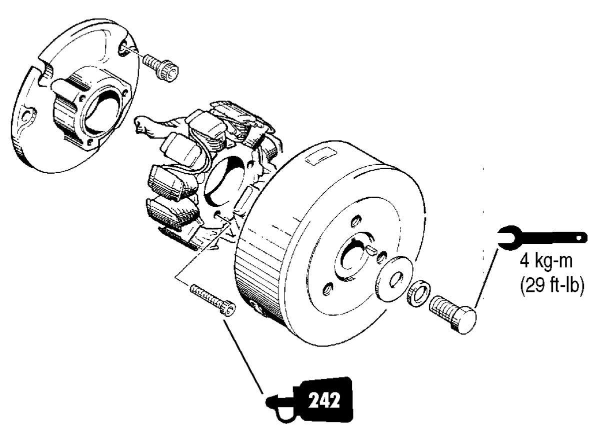

2-2.5 kg-m
(14.5-18 ft-lb)
2.5-2.8 kg-m
(18-20 ft-lb)
4-6 kg-m
(29-43 ft-lb)


2.6-3.3 kg-m
(19-24 ft-lb)


0.8-1.2 kg-m
(6-9 ft-lb)
0.7 kg-m
(5 ft-lb)


0.8-1.2 kg-m
(6-9 ft-lb)


0.7-1 kg-m
(5-7 ft-lb)
HT
0.7-1 kg-m
(5-7 ft-lb)
242
0.8-1.2 kg-m
(6-9 ft-lb)


4 kg-m
(29 ft-lb)
242

2

Installing Engine Table of Contents

60 cc Model 2-118
Twin F/C Models 2-119
Twin L/C Models 2-122
Triple Models 2-124

Installing Engine
(60 cc Model)

1. Place the engine assembly into position on the front end.

2. Connect the engine wiring harness to the main wiring harness.

Fig. 2-425



A957

3. Install the four cap screws, washers, and lock washers securing the engine to the front end. Do not tighten at this time.

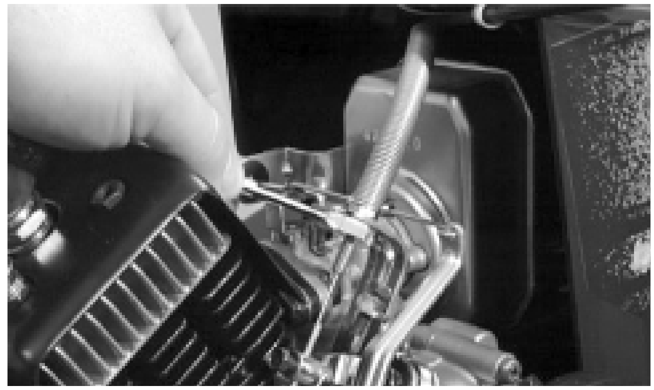
Fig. 2-426



A958

4. Attach the throttle cable.

Fig. 2-427



A953

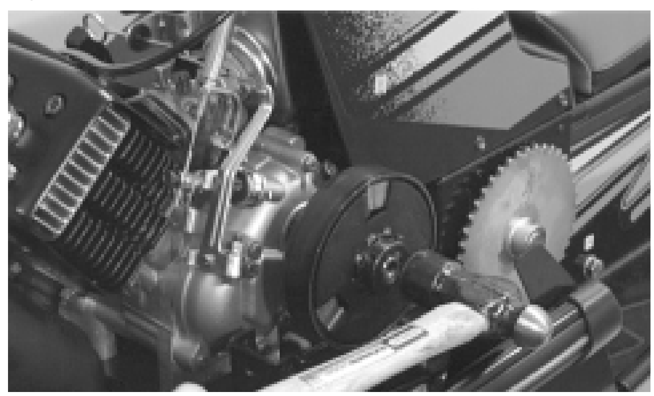
Fig. 2-428



A954

5. Align the clutch key with the primary shaft keyway; then using a hammer, gently drive the clutch onto the primary shaft.

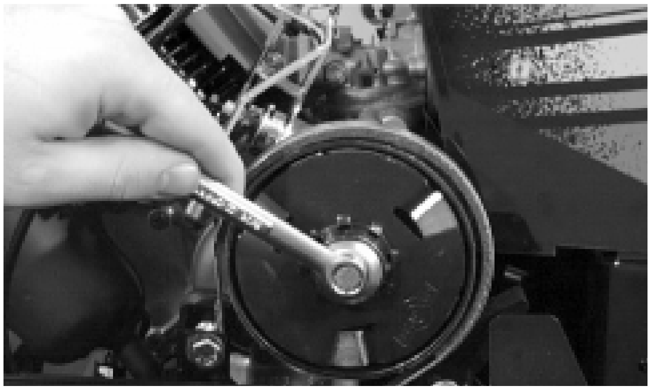
Fig. 2-429



A895

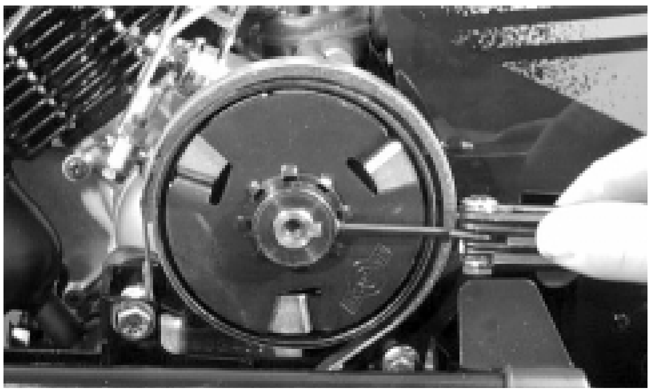
6. Secure the clutch with a washer and cap screw tightened to 0.8-1 kg-m (6-7 ft-lb); then tighten the set screw.

Fig. 2-430



A946

Fig. 2-431



A947

7. Install the drive chain making sure the spring lock is seated properly.

8. Align the drive and driven sprockets; then from beneath tighten the engine mounting cap screws to 2.1-2.8 kg-m (15-20 ft-lb).

9. Install the brake band assembly and brake cable.

Fig. 2-432



A951

10. Install the chain guard.

Fig. 2-433



A940

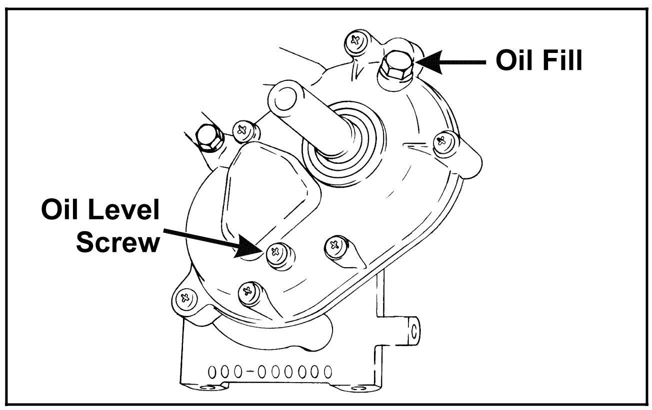
11. Using the cap screw, secure the hood cable to the engine.

12. Remove the oil fill plug located on the top of the gear case cover.

13. Remove the oil level screw from the lower side of the gear case cover.

14. Add SAE #10W-30 oil into the fill hole until oil flows out oil level hole.

Fig. 2-434



0726-196

15. Install the oil level screw and the oil fill plug.

Installing Engine (Twin F/C Models)

1. On the Panther/Z models, place each engine mounting bracket onto the engine. Secure with cap screws, washers, and lock washers. Tighten to 2.8 kg-m (20 ft-lb).

2. On the Panther/Z models, place the engine assembly into position in the engine compartment. Secure the engine to the front end with the cap screws, washers, and lock nuts. Tighten to 2.8-3.5 kg-m (20-25 ft-lb).

Fig. 2-435



AL201D

Fig. 2-436



AL200D

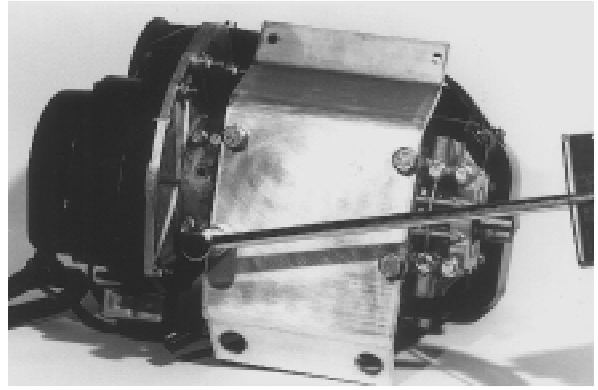
Fig. 2-437



AL199D

3. On the Bearcat models, apply red Loctite #271 to the threads of the four engine plate mounting cap screws. Place the plate into position on the engine and secure with four cap screws and lock washers. Tighten to 7.6 kg-m (55 ft-lb).

Fig. 2-438



AB063

4. On the Bearcat models, place the engine with plate assembly into position in the engine compartment; then making sure the female mounts and cup washers are properly positioned, secure the engine plate with cap screws and washers. Tighten to 2.8-3.5 kg-m (20-25 ft-lb).

Fig. 2-439



AL201D

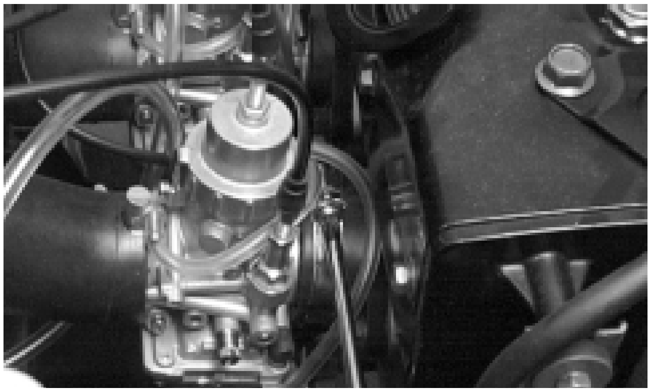
5. Connect the oil-supply hose to the oil-injection pump; then bleed the system (see Section 4).

■ **NOTE: If equipped with electric start, place the starter motor bracket on the crankcase and install the front two and lower rear cap screws, lock washers, and washers. Place the starter motor into position and secure with two washers and lock nuts.**

6. Connect the oil-injection cable to the oil-injection pump control arm and secure the cable mounting pin with a nylon washer and E-clip.

7. Place the carburetor(s) into position making sure the boot(s) are properly positioned and secure with the flange clamp(s).

Fig. 2-440



AH283D

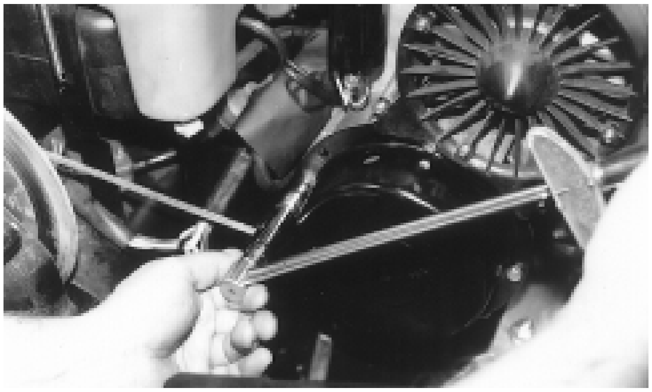
■ **NOTE: At this point, check oil-injection system synchronization (see Section 4).**

8. Connect the impulse hose to the crankcase, the main wiring harness, the CDI unit wiring harness, and the spark plug caps.

9. Place the recoil starter into position and secure with four cap screws and lock washers. Tighten to 0.7 kg-m (5 ft-lb) on the Bearcat models or to 1.1 kg-m (8 ft-lb) on the Panther/Z models.

■ **NOTE: If equipped with electric start, secure the battery ground cable with the rear cap screw.**

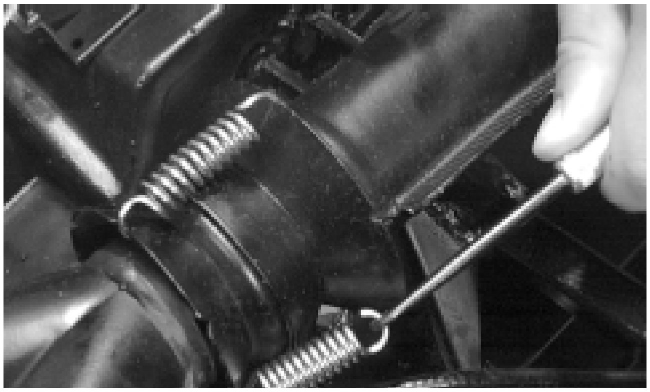
Fig. 2-441



AB073

10. Place the expansion chamber and grafoil gasket into position and secure with springs.

Fig. 2-442



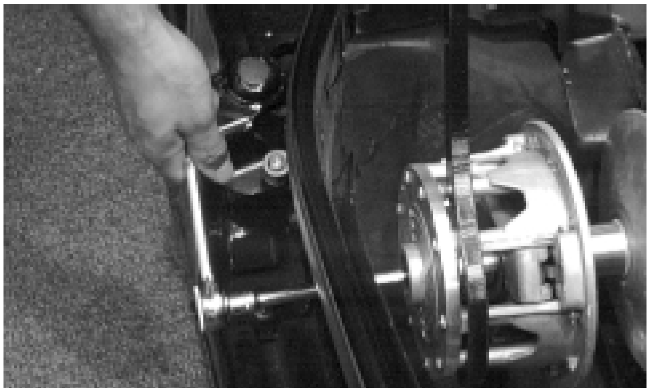
AB105D

11. On the Panther/Z models, place the engine mount shims into position between the torque bumper and engine mounting bracket; then tighten the torque bumper jam nut.

12. On the Bearcat models, install and adjust the torque bumper to allow a clearance between the engine and the torque bumper of 1.5 mm (0.060 in.); then secure the adjustment by tightening the jam nuts.

13. Place the drive clutch into position on the crankshaft; then install the lock washer and bolt. Tighten the clutch bolt to 6.9-7.6 kg-m (50-55 ft-lb).

Fig. 2-443



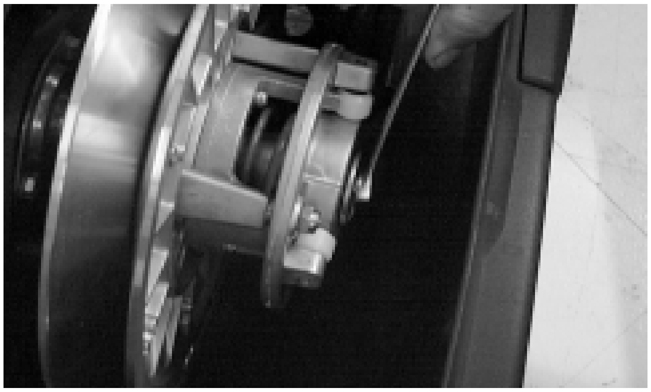
AF477D

■ **NOTE: Apply a coat of Anti-Seize Thread Compound (p/n 0678-146) to the keyway end of the driven shaft.**

14. Install the driven pulley and alignment washers. Secure with a cap screw and washer tightened to 2.6-3.3 kg-m (19-24 ft-lb).

2

Fig. 2-444



SC013D

■ **NOTE: At this point, check drive clutch/driven pulley alignment (see Section 8).**

15. Install the drive belt and secure the belt guard. Install the plug in the belly pan.

■ **NOTE: If equipped with electric start, connect the battery.**

16. Turn the gas tank shut-off valve to the OPEN position.

17. Check the ignition timing.

18. Place the rear of the snowmobile up on a safety stand. Start engine and allow to warm up. Adjust engine idle to 1500 RPM and check all safety switches for proper operation.

19. Test drive the snowmobile; then tighten the clutch bolt to 6.9-7.6 kg-m (50-55 ft-lb).

Fig. 2-445



AF477D

⚠ CAUTION

If the engine had a major overhaul or if any major part was replaced, proper engine break-in procedures must be followed.

Installing Engine
(Twin L/C Models)

1. Place the engine into the engine compartment; then place the coolant supply hose on the water pump and secure with the clamp.

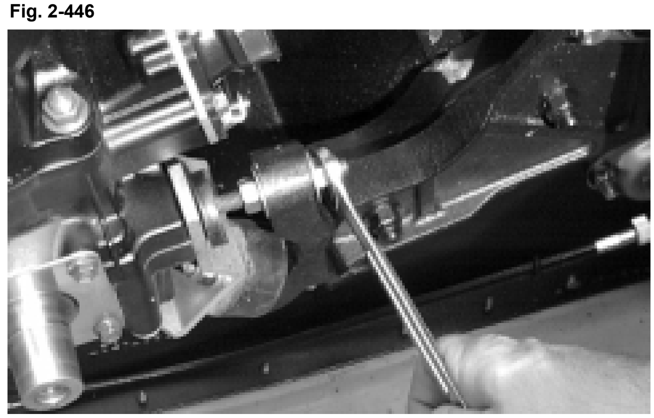
■ **NOTE: On the Wide Track, place the shims in their proper position on the left rear engine mount (as noted during removal).**

2. Secure the right-side front and rear and left-side front engine mounts to the front end making sure the mounts are properly positioned. Tighten the cap screws and nut to 2.8-3.5 kg-m (20-25 ft-lb).

■ **NOTE: On the 550 cc models, tighten the cap screws (w/lock nuts on the Panther) to 7.6 kg-m (55 ft-lb).**

3. On all models except the 550 cc, adjust the torque bumper to allow a clearance between the engine and the torque bumper of 1.78 mm (0.070 in.); then secure the adjustment by tightening the jam nuts.

Fig. 2-446



AN610D

4. On the 500/600 cc, secure the hood cable and ground wire to the magneto housing with the machine screw tightened to 1.1 kg-m (8 ft-lb).

5. On the 550/580 cc, attach the hood cable to the exhaust manifold and the ground wires to the magneto housing.

6. Secure the rear ground wires to the magneto housing with the machine screw tightened to 1.1 kg-m (8 ft-lb).

7. Place the coolant return hose into position on the thermostat housing and secure with the clamp.

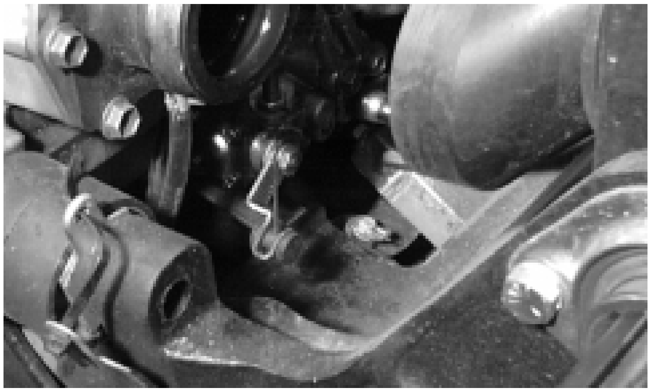
8. Place the recoil starter into position and secure the starter with four cap screws and lock washers. Tighten to 1 kg-m (7 ft-lb).

9. Connect all electrical wires.

■ **NOTE: Use cable ties to secure the wiring harnesses as necessary.**

10. Connect the oil-injection cable to the oil-injection pump and secure; then connect the oil-supply hose to the pump and secure with the clamp. Bleed the oil-injection system (see Section 4).

Fig. 2-447



AN392D

11. On carbureted models, connect the impulse hose to the crankcase.

■ **NOTE: On the 700 cc, install the air-intake silencer.**

Fig. 2-448



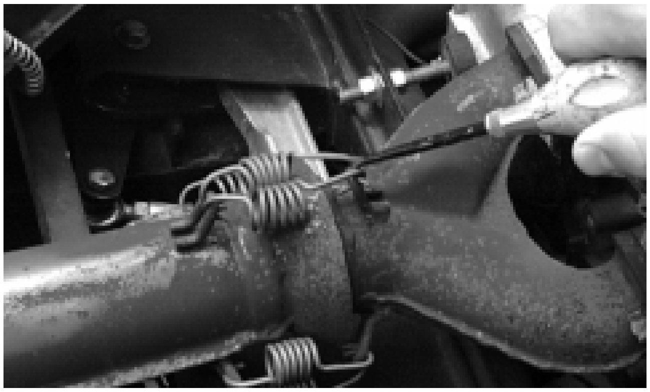
AN385D

12. Place the carburetors/throttle bodies into position and secure with the flange clamps. Synchronize the oil-injection system (see Section 4).

■ **NOTE: On the Wide Track, place the starter motor and end cap into position and secure with the lock nuts. Tighten securely.**

13. Place the expansion chamber and grafoil gaskets into position and secure to the exhaust manifold, front end, and resonator with the springs.

Fig. 2-449



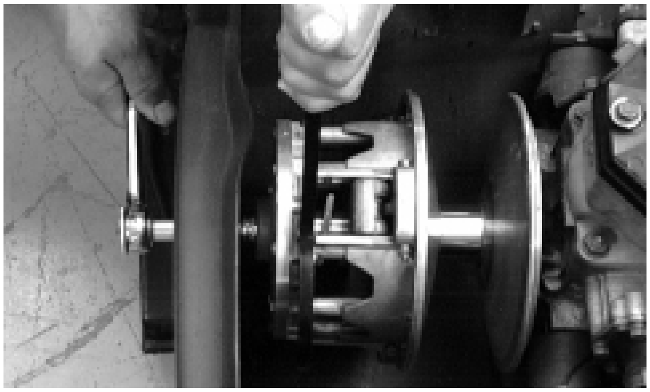
AN378D

■ **NOTE: When installing the three exhaust manifold springs, the long hook portion of the spring must be attached to the exhaust manifold or premature spring failure will result.**

■ **NOTE: Before installing the drive clutch, be sure to wipe both the crankshaft taper and clutch mounting taper clean using a clean towel.**

14. Place the drive clutch into position on the crankshaft making sure the two sleeves are properly positioned and secure with the bolt and lock washer. Tighten to 6.9-7.6 kg-m (50-55 ft-lb).

Fig. 2-450



AN381D

■ **NOTE: On the Wide Track, secure the side panel to the belly pan with the existing machine screws.**

■ **NOTE: Apply a coat of Anti-Seize Thread Compound (p/n 0678-146) to the keyway end of the driven shaft.**

15. Install the driven pulley, key, stub shaft, and alignment washers. Secure with a cap screw and washer. Tighten to 2.6-3.3 kg-m (19-24 ft-lb).

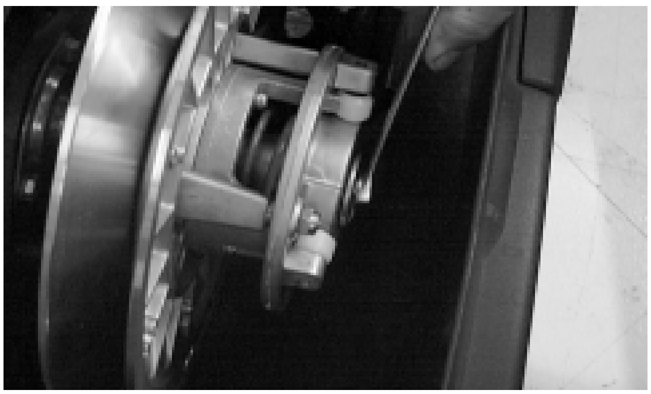
2

Fig. 2-451



AF120D

Fig. 2-452

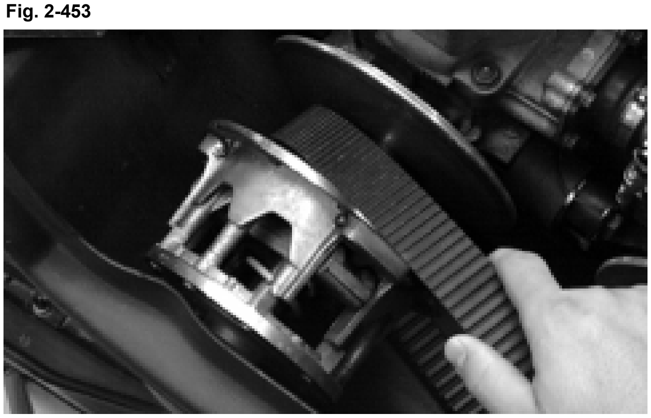


SC013D

16. Check drive clutch/driven pulley alignment (see Section 8).

17. Install the drive belt. Check belt deflection. Secure the belt guard.

Fig. 2-453



AN379D

■ **NOTE: On the Wide Track, secure the belly pan and bumper to the bumper support tube with a lock nut; then install the rear belly pan plug.**

18. Fill the cooling system (see Section 3).

19. On models equipped w/electric start, connect the positive cable to the starter motor; then secure with the washers and nut making sure the cable is directed toward the PTO-side of the engine. Secure the positive cable with a long cable tie.

20. On models equipped w/electric start, connect the cables to the battery making sure to connect the positive cable first.

21. Turn the gas tank shut-off valve to the OPEN position.

22. Start engine and verify ignition timing.

23. Test drive or run the snowmobile and recheck the coolant level after 5-6 minutes. Tighten the drive clutch to 7.6 kg-m (55 ft-lb).

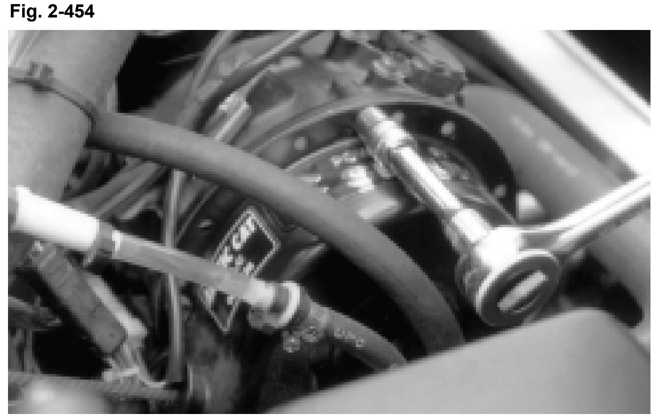
⚠ CAUTION
If the engine had a major overhaul or if any major component was replaced, proper engine break-in procedures must be followed. If the proper engine break-in procedures are not followed, severe engine damage may result.

Installing Engine
(Triple Models)

1. Secure the engine mounting brackets to the crankcase. Tighten the cap screws securing the front and right-side rear brackets to 2.4 kg-m (17 ft-lb). Tighten the rear PTO-side engine mount to 1.4 kg-m (10 ft-lb).

2. Place the engine assembly in the engine compartment. Place the recoil starter into position and secure with four cap screws and lock washers. Tighten to 0.7 kg-m (5 ft-lb).

Fig. 2-454



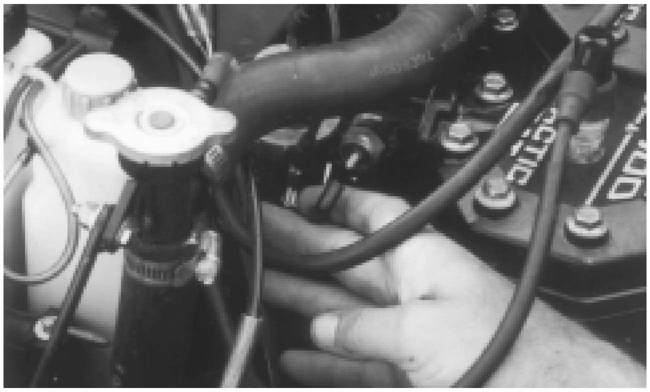
AN150

3. Place the resonator into position; then secure with the cap screws, washers, bushings, spacers, and retainer nuts.

■ **NOTE: On models equipped with electric start, make sure the battery ground cable and star washer are properly positioned.**

4. Connect the temperature-gauge sender wire.

Fig. 2-455

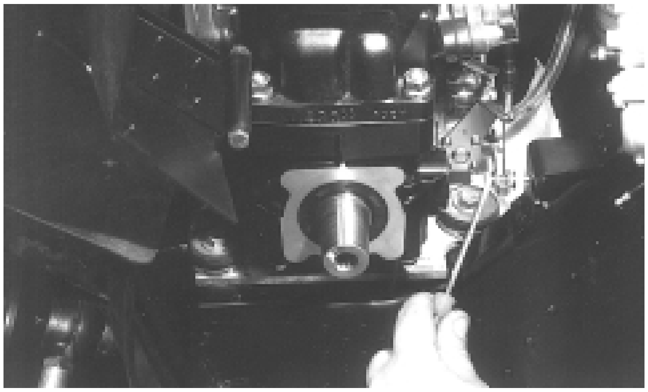


AJ159

5. Place the coolant hoses into position and secure with the clamps.

6. Connect the cable to the oil-injection pump and secure with the nylon washer and E-clip; then connect the oil-supply and oil-output hoses and secure with the clamp. Bleed the oil-injection pump (see Section 4).

Fig. 2-456

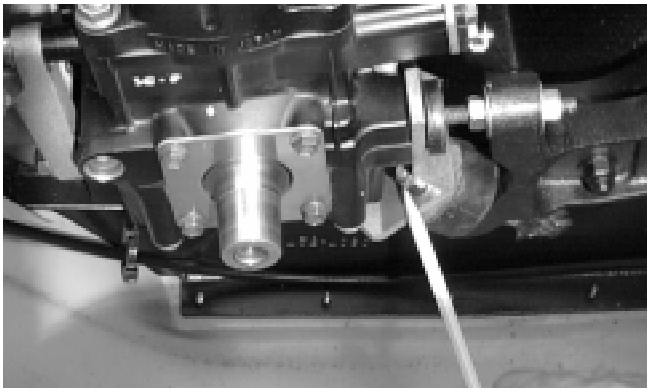


AN009

7. Connect the impulse hose to the crankcase.

8. Secure the right-side front and rear and left-side front engine mounts to the front end making sure the mounts are properly positioned. Tighten the cap screws and nut to 2.8-3.5 kg-m (20-25 ft-lb).

Fig. 2-457

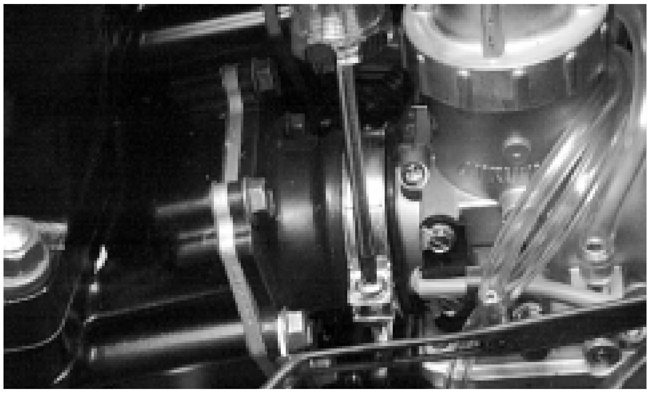


AN611D

9. Adjust the torque bumper to allow a clearance between the engine and the torque bumper of 1.78 mm (0.070 in.) on the 1000 cc or 1.5 mm (0.060 in.) on the 600/800 cc; then secure the adjustment by tightening the jam nuts.

10. Place the carburetors into position and secure with the flange clamps. Synchronize the oil-injection pump (see Section 4).

Fig. 2-458



AN614D

11. Connect the main wiring harness, ignition timing sensor wiring harness, and the spark-plug caps. Secure the two brown ground wires to the magneto housing with a cap screw.

Fig. 2-459



AQ125

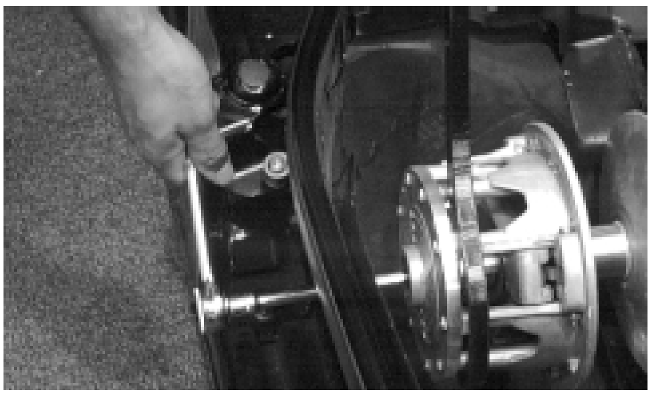
12. In order, place the expansion chambers and grafoil gaskets into position. Secure the expansion chambers to the header pipes and resonator with the springs. Secure the expansion chambers to the front end with the long spring.

13. Connect the hood cable to the cable hook; then secure the hook.

■ NOTE: Before installing the drive clutch, be sure to wipe both the crankshaft taper and clutch mounting taper clean using a clean towel.

14. Place the drive clutch into position on the crankshaft making sure the two sleeves are properly positioned (see Section 8) and secure with the clutch bolt and lock washer. Tighten to 6.9-7.6 kg-m (50-55 ft-lb). Install the belly pan plug.

Fig. 2-460

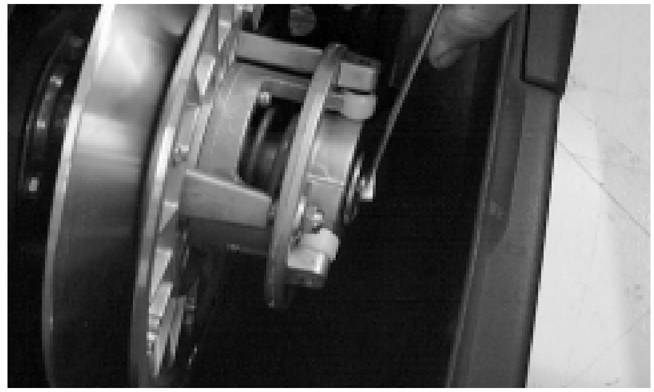


AF477D

■ NOTE: Apply a coat of Anti-Seize Thread Compound (p/n 0678-146) to the keyway end of the driven shaft.

15. Install the driven pulley, stub shaft, key, and washers (see Section 8). Secure with a cap screw. Tighten to 2.6-3.3 kg-m (19-24 ft-lb).

Fig. 2-461



SC013D

16. Check drive clutch/driven pulley alignment (see Section 8).

17. Install the drive belt. Check belt deflection (see Section 8). Secure the belt guard.

18. Fill the cooling system (see Section 3); then install the coolant filler cap.

19. Bleed the oil-injection system (see Section 4).

20. Turn the shut-off valve to the OPEN position.

21. Check ignition timing.

22. Test drive the snowmobile and recheck the coolant level after 5-10 minutes. Retighten the drive clutch to 7.6 kg-m (55 ft-lb).

⚠ CAUTION

If the engine had a major overhaul or if any major component was replaced, proper engine break-in procedures must be followed. If the proper engine break-in procedures are not followed, severe engine damage may result.

Troubleshooting Engine (Carbureted Models)

Problem: Engine Does Not Start (No Spark at Spark Plugs)	
Condition	**Remedy**
1. **Ignition switch** malfunctioning—not in RUN position	1. Replace ignition switch—turn switch to RUN position
2. **Wiring harness** shorting	2. Repair—replace wiring harness
3. **Emergency stop switch knob** in DOWN position—malfunctioning	3. Move knob to UP position—replace throttle switch
4. **Throttle/ignition monitor switch (TM-style)** adjusted too loose—malfunctioning	4. Adjust (tighten) throttle cable— replace throttle switch
5. **Throttle/ignition monitor switch (VM-style)** adjusted too tight—malfunctioning	5. Adjust (loosen) throttle cable—replace throttle switch
6. **Carburetor safety switches (VM-style)** adjusted incorrectly—malfunctioning	6. Adjust—replace carburetor safety switches
7. **Spark plugs** fouled—damaged	7. Clean—gap —replace spark plugs
8. **Spark-plug caps** damaged—leaking—shorting	8. Replace spark-plug caps
9. **High tension wires/coil** loose—grounded—faulty	9. Service—replace high tension wires/coil
10. **CDI unit** faulty	10. Replace CDI unit
11. **Charge coil (1)** faulty	11. Replace coil
12. **Charge coil (2)** faulty	12. Replace coil
13. **Flywheel magnets** weak	13. Replace flywheel
14. **Flywheel key** sheared	14. Replace key

Problem: Engine Does Not Start (No Fuel at Cylinders)	
Condition	**Remedy**
1. **Gas tank** empty	1. Fill tank
2. **Shut-off valve** closed	2. Open shut-off valve
3. **Fuel hose** broken—pinched	3. Replace—service hose
4. **Gas-tank vent—hose** obstructed	4. Remove obstruction—replace vent—hose
5. **In-line fuel filter** obstructed—damaged	5. Remove obstruction—replace in-line fuel filter
6. **Fuel pump** malfunctioning—faulty	6. Replace—repair—clean fuel pump
7. **Impulse hose** cracked—broken—pinched—disconnected	7. Replace—connect impulse hose
8. **Carburetors** adjusted incorrectly—dirty—damaged	8. Troubleshoot — clean—replace carburetors
9. **Primary compression (crankcase)** absent	9. Repair—replace damaged—worn engine components

Problem: Engine Does Not Start (Fuel Does Not Ignite)	
Condition	**Remedy**
1. **Carburetor-to-cylinder** air leak	1. Replace—service gaskets—intake flanges—connect oil delivery hose—service intake ports
2. **Carburetors** adjusted incorrectly—dirty—damaged	2. Troubleshoot—clean—replace carburetors
3. **Gasoline** contaminated	3. Clean tank—entire fuel system
4. **Engine** flooded	4. Troubleshoot carburetors—clean—replace air-intake silencer—clear engine by pulling recoil several times —install new spark plugs — try restarting engine
5. **Secondary compression (cylinder)** low	5. Repair—replace damaged—worn engine components
6. **Choke cable(s)** adjusted improperly	6. Check and adjust choke cable(s)

Problem: Engine Does Not Idle	
Condition	**Remedy**
1. **Carburetors** adjusted incorrectly—dirty—damaged	1. Troubleshoot—clean—replace carburetors
2. **Fuel pump** malfunctioning—faulty	2. Replace—repair—clean fuel pump
3. **Impulse hose** cracked—broken	3. Replace impulse hose
4. **Air-intake silencer** obstructed—damaged	4. Remove obstruction—replace air-intake silencer

Problem: Engine Loses Power	
Condition	**Remedy**
1. **Gas-tank vent—hose** obstructed	1. Remove obstruction—replace vent—hose
2. **Fuel hose** cracked—broken—pinched	2. Replace—service fuel hose
3. **In-line fuel filter** obstructed—damaged	3. Remove obstruction—replace in-line fuel filter
4. **Carburetors** adjusted incorrectly—dirty—damaged—loose	4. Troubleshoot—tighten—clean—replace carburetors
5. **Muffler** obstructed—disconnected—damaged	5. Remove obstruction—connect—replace muffler
6. **Air-intake silencer** obstructed—disconnected—damaged	6. Remove obstruction—connect—replace air-intake silencer
7. **Exhaust ports** carboned	7. Clean exhaust ports
8. **Spark plugs** fouled—damaged	8. Clean—gap—replace spark plugs
9. **High tension wires/coil** loose—faulty	9. Service—replace high tension wires/coil
10. **Spark-plug caps** leaking—shorting	10. Replace spark-plug caps
11. **Ignition timing** adjusted incorrectly	11. Time ignition
12. **Primary and secondary compression** low	12. Repair—replace damaged—worn engine components
13. **Charge coil (1)** faulty	13. Replace coil
14. **Charge coil (2)** faulty	14. Replace coil
15. **CDI unit** faulty	15. Replace CDI unit
16. **Oil-injection pump** malfunctioning—adjusted incorrectly	16. Replace—bleed—adjust oil-injection pump

Problem: Engine Overheats	
Condition	**Remedy**
1. **Spark plug heat range** too hot	1. Install lower heat-range spark plugs
2. **Coolant** low—absent	2. Add coolant
3. **Carburetors** adjusted incorrectly—jetted incorrectly—dirty	3. Troubleshoot—clean carburetors—jet correctly
4. **Carburetor-to-cylinder** air leak	4. Replace—repair gaskets—intake flanges —service intake ports
5. **Heat exchangers**—no snow for cooling	5. Select new trail—install ice studs to chew up hard packed snow and ice
6. **Rings/grooves** carboned	6. Clean—replace rings—pistons
7. **Exhaust ports** obstructed	7. Remove obstruction
8. **Muffler** obstructed	8. Remove obstruction
9. **Gas/air mixture** incorrect	9. Replace jets—adjust jet needle E-clip position
10. **Oil-injection pump** malfunctioning—adjusted incorrectly	10. Replace—bleed—adjust oil-injection pump
11. **Primary compression (crankcase)** low—absent	11. Repair—replace damaged—worn engine components
12. **Ignition timing** adjusted incorrectly	12. Time ignition
13. **Gasoline octane** too low	13. Use 87 minimum octane gasoline
14. **Water pump**—**thermostat** damaged—faulty	14. Replace—rebuild water pump—replace thermostat

Problem: Engine Backfires	
Condition	**Remedy**
1. **Throttle/ignition monitor switch** adjusted incorrectly	1. Adjust throttle cable free-play—service spring
2. **Spark plugs** fouled—damaged	2. Clean—gap—replace spark plugs
3. **Spark plug heat range** too hot	3. Install lower heat-range spark plugs
4. **High tension wires/coil** shorting	4. Service—replace high tension wires/coil
5. **Carburetor-to-cylinder** air leak	5. Repair—replace gaskets—intake flanges —service intake ports
6. **Carburetors** adjusted incorrectly—dirty—damaged—loose	6. Troubleshoot—tighten carburetors
7. **Gas/air mixture** incorrect—too lean	7. Adjust jetting
8. **Oil-injection pump** malfunctioning—adjusted incorrectly	8. Replace—bleed—adjust oil-injection pump

Problem: Engine Four-Cycles (Floods Excessively)	
Condition	**Remedy**
1. **Carburetors** adjusted incorrectly—dirty—damaged	1. Troubleshoot—clean carburetors
2. **Gas/air mixture** incorrect	2. Adjust jetting
3. **Oil-injection pump** malfunctioning—adjusted incorrectly	3. Replace—bleed—adjust oil-injection pump
4. **Air-intake silencer** obstructed	4. Remove obstruction

Problem: Engine Stops Gradually	
Condition	**Remedy**
1. **In-line fuel filter** obstructed—damaged	1. Remove obstruction—replace in-line fuel filter
2. **Fuel hose** obstructed—broken—pinched	2. Remove obstruction—replace—repair fuel hose
3. **Head gasket(s)** burned out	3. Replace head gasket(s)—service cylinders—head
4. **Cylinder head** loosening	4. Tighten cylinder head cap screws
5. **Spark plugs** loose	5. Tighten spark plugs
6. **Impulse hose** cracked	6. Replace impulse hose
7. **High tension wires/coil** faulty	7. Service—replace high tension wires/coil
8. **Float bowl vent hose (TM-style)** obstructed—kinked—damaged	8. Service—replace float bowl vent hose

Problem: Engine Stops Suddenly	
Condition	**Remedy**
1. **In-line fuel filter** obstructed—damaged	1. Remove obstruction—replace in-line fuel filter
2. **Fuel hose** obstructed—broken—pinched	2. Remove obstruction—repair—replace fuel hose
3. **CDI unit** faulty	3. Replace CDI unit
4. **Ignition coil** faulty	4. Replace ignition coil
5. **Charge coil (1)** faulty	5. Replace coil
6. **Charge coil (2)** faulty	6. Replace coil
7. **Gas-tank vent—hose** obstructed—damaged	7. Remove obstruction—replace vent—hose
8. **Engine** seized	8. Overhaul engine
9. **Throttle/ignition monitor switch** faulty—throttle cable adjusted incorrectly	9. Replace throttle control—adjust throttle cable free-play — adjust—connect—replace carburetor safety switches (VM-style)

Problem: Engine Fails to Stop (Continues to Run, Even with All Switches Off)	
Condition	**Remedy**
1. **CDI unit** shorted to ground	1. Replace CDI unit
2. **Main wiring harness four-prong connector** disconnected	2. Connect four-prong connector

Troubleshooting Engine (EFI Models)

Problem: Engine Does Not Start (No Spark at Spark Plugs)	
Condition	**Remedy**
1. **Ground connections** dirty—loose	1. Check all ground connections—clean and tight
2. **Throttle/ignition monitor switch** malfunctioning—**ignition switch** not on	2. Replace faulty switch—turn switch on
3. **Wiring harness** shorting—disconnected	3. Repair—replace—connect wiring harness
4. **Emergency stop switch** in DOWN position—malfunctioning	4. Move switch to UP position—replace throttle control
5. **Throttle/ignition monitor switch** malfunctioning	5. Adjust throttle cable tension—replace throttle body assembly
6. **Spark plugs** fouled—damaged	6. Clean—replace spark plugs
7. **Spark-plug caps** damaged—leaking—shorting	7. Replace spark-plug caps
8. **High tension leads/coil** loose—grounded—faulty	8. Service—replace high tension leads/coil
9. **CDI unit** faulty	9. Replace ECU
10. **Ignition timing sensor** faulty	10. Replace sensor
11. **ECU** faulty	11. Replace ECU

Problem: Engine Does Not Start (No Fuel at Cylinders)	
Condition	**Remedy**
1. **Gas tank** empty	1. Fill tank
2. **Injector dropping resistor** faulty	2. Replace dropping resistor
3. **Fuel pressure regulator** faulty	3. Replace regulator—hose
4. **Gasoline** contaminated	4. Replace gasoline
5. **Fuel pump** faulty	5. Service—replace fuel pump—connections—wires
6. **Fuel hose** broken—pinched	6. Replace—service hose
7. **Gas-tank vent—hose** obstructed	7. Remove obstruction—replace vent—hose
8. **Pick-up valve(s)** obstructed—damaged	8. Remove obstruction—replace pick-up valve(s)
9. **Primary compression** absent	9. Repair—replace damaged—worn engine components
10. **ECU** faulty	10. Replace ECU

Problem: Engine Does Not Start (Fuel Does Not Ignite)	
Condition	**Remedy**
1. **ECU LED** trouble code	1. Service—replace problem component
2. **Spark** absent	2. Check for spark—see No Spark at Spark Plugs sub-section
3. **Primary compression** low	3. Service engine
4. **Secondary compression** low	4. Service engine
5. **Engine** flooded	5. Clear engine (hold throttle full-open)
6. **Gasoline** contaminated	6. Clean tank and entire fuel system

Problem: Engine Does Not Idle	
Condition	**Remedy**
1. **ECU LED** trouble code	1. Service—replace problem component
2. **Throttle position sensor idle adjustment** incorrect	2. Adjust idle RPM to specifications
3. **Injector(s)** faulty	3. Replace injector(s)
4. **Fuel pressure regulator** faulty	4. Replace regulator— hose
5. **Air-intake silencer** obstructed	5. Clean air-intake silencer

Problem: Engine Loses Power or Runs on One Cylinder	
Condition	**Remedy**
1. **Sensor** faulty	1. Check LED for trouble code—repair—replace problem circuit or sensor
2. **Spark plug** fouled	2. Replace spark plugs
3. **External coil** faulty	3. Service — replace coil
4. **Gas tank vent — hose** obstructed	4. Service — replace vent hose
5. **Secondary compression** low	5. Service engine
6. **CDI unit** faulty	6. Replace ECU
7. **Fuel pressure regulator** faulty	7. Replace regulator
8. **Pick-up valve(s)** obstructed — out of position	8. Replace—relocate pick-up valve(s)
9. **Oil-injection pump** malfunctioning—adjusted incorrectly	9. Replace—bleed—adjust oil-injection pump
10. **Throttle bodies** out of synchronization	10. Replace throttle bodies from a similar engine—if problem is corrected, replace the original assembly
11. **Injector** faulty	11. Replace injector
12. **Dropping resistor** faulty	12. Test resistor—replace as necessary

Problem: Engine Overheats	
Condition	**Remedy**
1. **Spark plug heat range** too hot	1. Install lower heat-range spark plugs
2. **Coolant** low — absent	2. Add coolant
3. **Heat exchanger** obstructed	3. Remove obstruction
4. **Intake flange to cylinder** air leak	4. Replace — seal intake flange(s)
5. **Drive system (drive clutch — driven pulley — track — drive belt)** adjusted incorrectly — worn — damaged	5. Troubleshoot — adjust drive system
6. **Rings/grooves** carboned	6. Clean — replace rings — pistons
7. **Exhaust ports** obstructed	7. Remove obstruction
8. **Expansion chamber** obstructed	8. Remove obstruction
9. **Oil-injection pump** malfunctioning — adjusted incorrectly	9. Replace — bleed — adjust oil-injection pump
10. **Primary compression** low — absent	10. Repair — replace damaged — worn engine components
11. **Gasoline octane** too low	11. Use 87 minimum octane gasoline
12. **Water pump — thermostat** damaged — faulty	12. Replace water pump — thermostat

Problem: Engine Backfires	
Condition	**Remedy**
1. **LED** trouble code	1. Service — replace problem component
2. **Throttle/ignition monitor switch** adjusted incorrectly	2. Adjust throttle cable tension — service spring
3. **Spark plugs** fouled — damaged	3. Clean — replace spark plugs
4. **High tension leads/coil** shorting	4. Service — replace high tension leads/coil
5. **CDI unit** faulty — damaged	5. Replace ECU
6. **Fuel mixture** lean	6. Repair fuel regulator — injector(s)
7. **Oil-injection pump** malfunctioning — adjusted incorrectly	7. Replace — bleed — adjust oil-injection pump

Problem: Engine Four-Cycles (Floods Excessively)	
Condition	**Remedy**
1. **LED** trouble code	1. Service — replace problem component
2. **Fuel pressure** too high	2. Replace regulator — hose
3. **Injector** faulty	3. Replace injector
4. **Throttle position sensor** faulty	4. Replace throttle body assembly
5. **Air-intake silencer** obstructed	5. Remove obstruction

Problem: Engine Stops Suddenly	
Condition	**Remedy**
1. **Gas tank** empty	1. Fill tank
2. **Spark** absent	2. See No Spark at Spark Plugs sub-section
3. **LED** trouble code	3. Service — replace problem component
4. **CDI relay** faulty	4. Replace CDI relay
5. **Fuel filter(s)** obstructed	5. Replace filter(s)
6. **Fuel pressure** low	6. Replace regulator — hose
7. **Fuel pump** faulty	7. Service — replace fuel pump
8. **Fuel pump relay** faulty	8. Replace relay
9. **Gas tank vent hose** obstructed	9. Service vent hose
10. **ECU** faulty	10. Replace ECU
11. **Fuel hose** obstructed—broken—pinched	11. Remove obstruction—repair—replace fuel hose
12. **CDI unit** faulty	12. Replace ECU
13. **Ignition coil** faulty	13. Replace ignition coil
14. **Engine** seized	14. Overhaul engine
15. **Throttle/ignition monitor switch — throttle cable tension** faulty—adjusted incorrectly	15. Replace throttle control—adjust throttle cable

Problem: Engine Fails to Stop (Continues to Run, Even with All Switches Off)	
Condition	**Remedy**
1. **CDI unit** shorted to ground	1. Replace ECU
2. **Engine wiring harness connections** wet	2. Clean — dry connections

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2000 Arctic Cat Engine Specifications

ITEM	120 cc	340 cc	370 cc	440 cc (F/C)	440 cc (L/C)	500 cc Carb	500 cc EFI	550 cc	580 cc EFI	600 cc EFI	600 cc Carb (Triple)	600 cc Carb (Twin)	700 cc	800 cc	1000 cc
Engine Model Number	N/A	AG34A8	AA37A2	AS44A3	AL44L9	AS50L4	AT50L4	CB55L1	AD58L4	AD60L4	AA60L6	AE60L4	AB70L8	AA80L6	AA10L3
Displacement — cc — cu. in.	119 7.3	339 20.68	367 22.41	431 26.3	436 26.60	497 30.3	497 30.3	550 33.56	580 35.42	599 36.54	594 36.24	599 36.54	700 42.71	794 48.45	999 60.96
No. of Cylinders	1	2	2	2	2	2	2	2	2	2	3	2	2	3	3
Bore — mm — in.	60 2.4	60 2.362	60 2.362	65 2.559	68 2.677	71 2.800	71 2.800	73.4 2.890	75.4 2.968	78 3.071	66.5 2.618	78 3.071	81 3.19	72 2.835	81 3.19
Stroke — mm — in.	42 1.7	60 2.362	65 2.559	65 2.559	60 2.362	62.7 2.469	62.7 2.469	65 2.559	65 2.559	62.7 2.469	57 2.240	62.7 2.469	68 2.677	65 2.559	64.6 2.54
Compression Ratio	N/A	6.8:1	6.3:1	6.5:1	6.5:1	6.74:1	6.74:1	6.6:1	6.5:1	6.55:1	6.4:1	6.55:1	6.0:1	6.5:1	6.4:1
Cooling System	Fan Cooled	Fan Cooled	Fan Cooled	Fan Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled	Liquid Cooled
Gasoline Octane (min)	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87
Fuel Mixture	N/A	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection	Oil Injection
Ignition Timing degrees — mm — in.	Fixed	16① 1.440 0.056	13① 1.056 0.042	18① 2.012 0.079	18① 1.860 0.073	24④ 3.390 0.133	24④ 3.390 0.133	24① 3.540 0.139	30② 5.459 0.215	20⑤ 2.371 0.093	27② 3.884 0.153	24③ 3.390 0.133	27② 4.625 0.182	12⑥ 0.886 0.035	16② 1.556 0.061
Spark Plug (NGK)	BPR6ES	BR9EYA	BR9EYA	BR9EYA	BR9EYA	BR10EYA	BR9EYA	BR9EYA	BR9EYA	BR9EYA	BR9EYA	BR9EYA	BR10ES	BR9EYA	BR9EYA
Spark Plug Gap — mm — in.	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031	0.7-0.8 0.028-0.031
Lighting Coil Output	N/A	12V/185W	12V/185W	12V/185W	12V/215W	12V/210W	12V/175W	12V/180W	12V/175W	12V/175W	12V/210W	12V/210W	12V/200W	12V/185W	12V/185W
Ignition Type	Transistorized	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI	CDI/NOI
Piston Skirt/Cylinder — mm Clearance Range — in.	0.020-0.120 0.0008-0.0047	0.060-0.150 0.0024-0.0059	0.060-0.150 0.0024-0.0059	0.080-0.150 0.0031-0.0059	0.115-0.150 0.0045-0.0059	0.083-0.150 0.0033-0.0059	0.083-0.150 0.0033-0.0059	0.095-0.150 0.0037-0.0059	0.095-0.150 0.0037-0.0059	0.083-0.150 0.0033-0.0059	0.085-0.150 0.0034-0.0059	0.083-0.150 0.0033-0.0059	0.095-0.150 0.0037-0.0059	0.095-0.150 0.0037-0.0059	0.095-0.150 0.0037-0.0059
Piston Ring End — mm Gap Range — in.	0.20-0.70 0.0079-0.0280	0.15-0.80 0.006-0.031	0.15-0.80 0.006-0.031	0.15-0.83 0.006-0.033	0.20-0.83 0.008-0.033	0.20-0.83 0.008-0.033	0.20-0.83 0.008-0.033	0.20-0.83 0.008-0.033	0.20-0.83 0.008-0.033	0.20-0.83 0.008-0.033	0.20-0.83 0.008-0.033	0.20-0.83 0.008-0.033	0.20-0.80 0.008-0.031	0.20-0.83 0.008-0.033	0.20-0.83 0.008-0.033
Cylinder Trueness — mm Limit (max) — in.	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004	0.1 0.004
Piston Pin — mm Diameter Range — in.	14.980-14.995 0.5898-0.5904	15.995-16.000 0.6297-0.6299	17.995-18.000 0.7085-0.7087	15.995-16.000 0.6297-0.6299	17.995-18.000 0.7085-0.7087	19.995-20.000 0.7872-0.7874	19.995-20.000 0.7872-0.7874	19.995-20.000 0.7872-0.7874	19.995-20.000 0.7872-0.7874	19.995-20.000 0.7872-0.7874	17.995-18.000 0.7085-0.7087	19.995-20.000 0.7872-0.7874	19.995-20.000 0.7872-0.7874	19.995-20.000 0.7872-0.7874	19.995-20.000 0.7872-0.7874
Piston Pin Bore — mm Diameter Range — in.	15.006-15.030 0.5908-0.5917	15.998-16.006 0.6298-0.6302	17.998-18.006 0.7086-0.7089	15.996-16.004 0.6298-0.6301	17.998-18.006 0.7086-0.7089	20.002-20.010 0.7875-0.7878	20.002-20.010 0.7875-0.7878	20.002-20.010 0.7875-0.7878	20.002-20.010 0.7875-0.7878	20.002-20.010 0.7875-0.7878	18.002-18.008 0.7087-0.7090	20.002-20.010 0.7875-0.7878	20.002-20.010 0.7875-0.7878	20.002-20.010 0.7875-0.7878	20.002-20.010 0.7875-0.7878
Connecting Rod Small — mm End Bore Diameter — in. Range	15.006-15.030 0.5908-0.5917	21.003-21.011 0.8269-0.8272	23.003-23.011 0.9056-0.9059	21.003-21.011 0.8269-0.8272	23.003-23.011 0.9056-0.9059	26.003-26.011 1.0237-1.0241	26.003-26.011 1.0237-1.0241	26.003-26.011 1.0237-1.0241	26.003-26.011 1.0237-1.0241	26.003-26.011 1.0237-1.0241	23.003-23.011 0.9056-0.9059	26.003-26.011 1.0237-1.0241	26.003-26.011 1.0237-1.0241	26.003-26.011 1.0237-1.0241	26.003-26.011 1.0237-1.0241
Connecting Rod — mm Radial Play Range — in.	0.015-0.070 0.0006-0.0028	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012	0.02-0.03 0.0008-0.0012
Crankshaft Runout — mm (t.i.r.) — in.	0.10 0.004	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002	0.05 0.002
Crankshaft End — mm Play Range — in.	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004	0.05-0.10 0.002-0.004
Reed Stopper — mm Height — in.	N/A	N/A	N/A	N/A	N/A	9.4 - 9.8 0.370 - 0.385	9.4-9.8 0.370-0.385	N/A	N/A	9.4 - 9.8 0.370 - 0.385	9.3 - 9.9 0.366 - 0.389	9.4 - 9.8 0.370 - 0.385	8.6 - 9.0 0.338 - 0.354	6.7 - 7.3 0.263 - 0.287	9.3 - 9.9 0.366 - 0.389

① @ 6000 RPM - Engine warm
② @ 4000 RPM
③ @ 3250 RPM
④ @ 3500 RPM
⑤ @ 5000 RPM
⑥ @ 1800 RPM

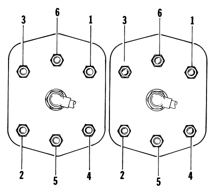
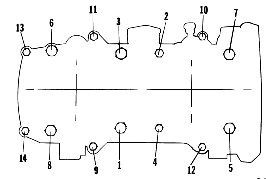
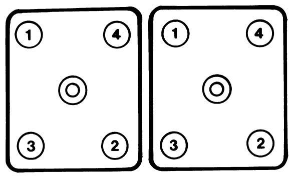
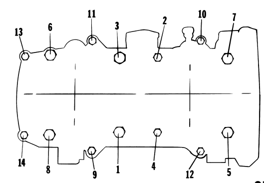
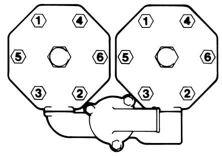
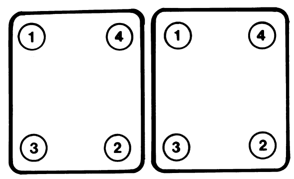
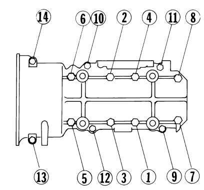
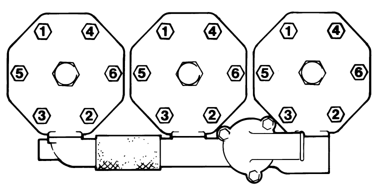
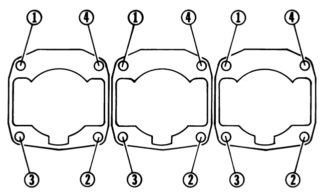
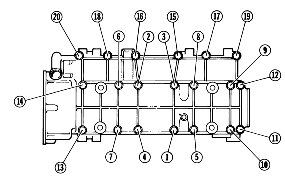
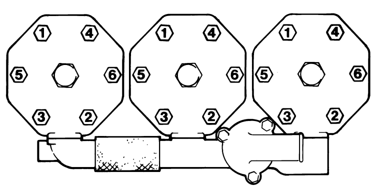
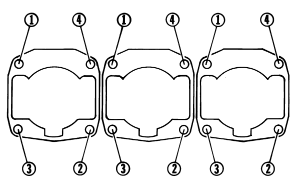
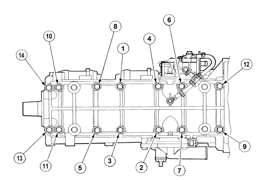
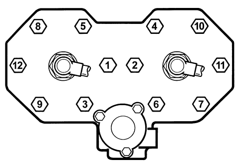
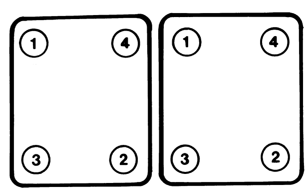
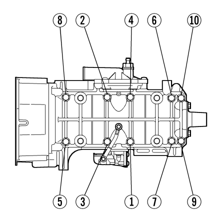
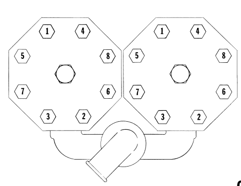
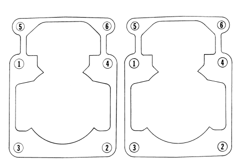
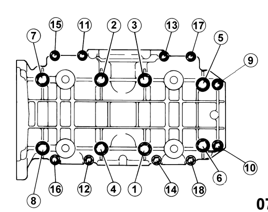
2000 Arctic Cat Engine Torque Specifications

Model		60 cc	340 cc	370 cc/ 440 cc (F/C)	440 cc (L/C) Lightweight	ZR 440 Sno-Pro	550 cc	580 cc EFI	500 cc	600 cc EFI	600 cc (Carb-Twin)	600 cc (Carb-Triple)	700 cc	800 cc	1000 cc
Cylinder Head	ft-lb	6-9	13-20	13-20	13-20	13-20	13-20	13-20	13-20	13-20	13-20	14.5-18	13-20	13-20	13-20
	kg-m	0.8-1.2	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	2.0-2.5	1.8-2.8	1.8-2.8	1.8-2.8
Cylinder Base	ft-lb	N/A	N/A	N/A	21.5-29	21.5-29	29-43.5	29-43.5	29-43.5	29-43.5	29-43.5	13-20	22-29	29-43.5	29-43.5
10 mm	kg-m				3.0-4.0	3.0-4.0	4.0-6.0	4.0-6.0	4.0-6.0	4.0-6.0	4.0-6.0	1.8-2.8	3.0-4.0	4.0-6.0	4.0-6.0
Flywheel	ft-lb	22-29	50.5-65	50.5-65	50.5-65	50.5-65	50.5-65	50.5-65	50.5-65	50.5-65	50.5-65	50.5-65	50.5-65	29-43.5	29-43.5
	kg-m	3.0-4.0	7.0-9.0	7.0-9.0	7.0-9.0	7.0-9.0	7.0-9.0	7.0-9.0	7.0-9.0	7.0-9.0	7.0-9.0	7.0-9.0	7.0-9.0	4.0-6.0	4.0-6.0
Intake Manifold	ft-lb	N/A	13-16	6-8.5	13-16	13-16	13-16	13-16	6-8.5	6-8.5	6-8.5	6-8.5	13-16	6-8.5	6-8.5
or Flange	kg-m		1.8-2.2	0.8-1.2	1.2-2.2	1.2-2.2	1.2-2.2	1.8-2.2	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2	1.8-2.2	0.8-1.2	0.8-1.2
Exhaust Manifold &	ft-lb	6-8	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16
Intake Flange	kg-m	0.8-1.1	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2
Flywheel	ft-lb	N/A	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16	13-16
Housing	kg-m		1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2	1.8-2.2
Crankcase 6 mm	ft-lb	4.5-7	6-8.5	6-8.5	6-8.5	6-8.5	6-8.5	6-8.5	6-8.5	6-8.5	6-8.5	6-8.5	6-8.5		
	kg-m	0.6-1	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2	N/A	N/A
8 mm	ft-lb		13-20	13-20	13-20	13-20	13-20	13-20	13-20	13-20	13-20	13-20	13-20		
	kg-m	N/A	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	1.8-2.8	N/A	N/A
10 mm	ft-lb					29-43.5			29-43.5	29-43.5	29-43.5		29-43.5	29-43.5	29-43.5
	kg-m	N/A	N/A	N/A	N/A	4.0-6.0	N/A	N/A	4.0-6.0	4.0-6.0	4.0-6.0	N/A	4.0-6.0	4.0-6.0	4.0-6.0
Spark Plug	ft-lb	18-20	18-20	18-20	18-20	18-20	18-20	18-20	18-20	18-20	18-20	18-20	18-20	18-20	18-20
	kg-m	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8	2.5-2.8
Drive Clutch	ft-lb	6-7	50-55	50-55	50-55	50-55	50-55	50-55	50-55	50-55	50-55	50-55	50-55	50-55	50-55
	kg-m	0.8-1.0	6.9-7.6	6.9-7.6	6.9-7.6	6.9-7.6	6.9-7.6	6.9-7.6	6.9-7.6	6.9-7.6	6.9-7.6	6.9-7.6	6.9-7.6	6.9-7.6	6.9-7.6

TORQUE CONVERSIONS

ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m
1	0.1	11	1.5	21	2.9	31	4.3	41	5.7	51	7.1	61	8.4	71	9.8	81	11.2	91	12.6
2	0.3	12	1.7	22	3.0	32	4.4	42	5.8	52	7.2	62	8.6	72	10.0	82	11.3	92	12.8
3	0.4	13	1.8	23	3.2	33	4.6	43	5.8	53	7.3	63	8.7	73	10.1	83	11.5	92	12.9
4	0.6	14	1.9	24	3.3	34	4.7	44	6.1	54	7.5	64	8.9	74	10.2	84	11.6	94	13.0
5	0.7	15	2.1	25	3.5	35	4.8	45	6.2	55	7.6	65	9.0	75	10.4	85	11.8	95	13.1
6	0.8	16	2.2	26	3.6	36	5.0	46	6.4	56	7.7	66	9.1	76	10.5	86	11.9	96	13.3
7	1.0	17	2.4	27	3.7	37	5.1	47	6.5	57	7.9	67	9.3	77	10.7	87	12.0	97	13.4
8	1.1	18	2.5	28	3.9	38	5.3	48	6.6	58	8.0	68	9.4	78	10.8	88	12.2	98	13.6
9	1.2	19	2.6	29	4.0	39	5.4	49	6.8	59	8.2	69	9.5	79	10.9	89	12.3	99	13.7
10	1.4	20	2.8	30	4.2	40	5.5	50	6.9	60	8.3	70	9.7	80	11.1	90	12.5	100	13.8

2000 ENGINE TORQUE PATTERNS

ENGINE SIZE	CYLINDER HEAD	CYLINDER BASE	CRANKCASE
340 cc	 0728-514	N/A	 0726-412
370 cc 440 cc F/C	 0725-318	N/A	 0726-412
440 cc L/C 550 cc 580 cc	 0728-138	 725-318B	 0728-137
800 cc 1000 cc	 0729-587	 0729-585	 0729-590
600 cc (Triple)	 0729-587	 0729-585	 0731-342
500 cc 600 cc (Twin)	 0733-524	 725-318B	 0734-050
700 cc	 0727-158	 0726-376	 0727-491

Piston Replacement Guide

ENGINE SIZE	YEAR	PISTON	RING	PISTON & RING SET
340 cc (F/C & F/A)	1976-2000	3005-130 3002-761	3004-825 3002-740	3005-472
370 cc	1999-2000	3005-447	3004-448 3004-825	3005-476
440 cc (F/C & F/A)	1980-2000	3005-342 3005-156 3004-530	3002-742	3005-474
440 cc F/C (Z)	1995-1998, 2000	3005-342 3005-156 3004-530 3002-927 3002-835	3002-742 3002-076	3005-586 3005-474
440 cc F/C (Z)	1999	3005-342	3005-530	3005-684
440 cc (L/C)	1978-2000	3005-384 3005-177 3003-885 3003-840 3003-477 3002-596	3002-738	3005-586 3005-475
440 cc (ZR)	1991-1995	3004-515 3003-974	3003-989	3003-993 3003-831
440 cc (ZR)	1996-1998	3005-356 3005-254 3005-095 3004-954	3004-768	3005-370
440 cc (Sno-Pro)	1998	3005-356	3004-768	3005-178
500 cc F/C (48 hp)	1976-1988	3002-856 3002-646	3002-324 3002-073	3005-683
500 cc F/C (56 hp)	1986-1988 1989-1990	3003-210 3003-547	3002-324 3003-548	3004-817
500 cc	1980-1985	3002-876	3002-324	3005-685
500 cc (Twin)	1998-2000	3005-250 3005-122	3005-123	3005-173
530 cc	1986-1991 Single Ring Option	3003-687 3003-303 3003-328	3003-304 3004-528	3005-686
550 cc (EFI & CARB)	1991-1992	3004-122 3003-927 3003-758	3003-760	3005-229 3003-887
550 cc (EFI & CARB)	1993-2000	3005-407 3004-684 3004-062	3003-760	3005-437 3004-198
580 cc (EFI & CARB)	1993-2000	3005-436 3005-187 3004-542 3004-542 3004-066	3004-067	3004-075
600 cc (Twin)	1998-2000	3005-438	3003-714	3005-445
600 cc (Triple)	1995-2000	3005-388 3005-031 3004-767	3004-768	3005-627
650 cc	1988-1990	3003-828	3003-714	3005-687
700 cc (CARB)	1991-1993	3005-382 3004-920 3003-754	3003-822	3005-228 3003-888
700 cc (EFI & CARB)	1994-1996, 1999-2000	3005-382 3004-920 3004-143	3003-822	3004-325
800 cc	1995-2000	3004-738	3004-528	3004-762
900 cc	1993-1997	3004-936 3004-078	3004-079	3004-086
1000 cc	1998-2000	3005-218	3003-822 3005-219	3005-220
60 cc	1990-1999 1976-1989	3002-476 3002-476	3003-683 3002-477	3004-909 (+.0040 in.)

■ **NOTE: The top part number in each case is the latest part. Those part numbers listed below the top number are also good replacement parts.**

ENGINE PISTON TRAVEL VERSUS CRANK ANGLE CHART

When using any of the charts below, first know the engine stroke and timing in degrees; then select the proper chart and read across from the degree figure to find timing in either mm or inches.

	600 cc (Triple)		340 cc F/C - 440 cc Lightweight L/C		500 cc - 600 cc (Twin)		ZR 440		1000 cc		370 cc F/C - 440 cc F/C - 550 cc - 580 cc		800 cc		700 cc	
	57mm stroke		60mm stroke		62.7mm stroke		63mm stroke		64.6mm stroke		65mm stroke		65mm stroke		68mm stroke	
Degree BTDC	mm BTDC	Inches BTDC	mm BTDC	Inches BTDC	mm BTDC	Inches BTDC	mm BTDC	Inches BTDC	mm BTDC	Inches BTDC	mm BTDC	Inches BTDC	mm BTDC	Inches BTDC	mm BTDC	Inches BTDC
5	0.137	0.005	0.120	0.005	0.150	0.006	0.151	0.005	0.153	0.006	0.157	0.006	0.155	0.006	0.163	0.006
6	0.197	0.007	0.180	0.007	0.216	0.009	0.218	0.008	0.221	0.009	0.226	0.009	0.222	0.009	0.234	0.009
7	0.268	0.010	0.300	0.011	0.295	0.012	0.296	0.011	0.300	0.012	0.308	0.012	0.303	0.012	0.319	0.012
8	0.350	0.014	0.360	0.014	0.384	0.015	0.387	0.015	0.392	0.015	0.402	0.016	0.395	0.015	0.417	0.016
9	0.443	0.017	0.480	0.018	0.486	0.019	0.489	0.019	0.496	0.020	0.508	0.020	0.500	0.019	0.527	0.020
10	0.546	0.021	0.600	0.023	0.600	0.024	0.603	0.023	0.612	0.024	0.627	0.025	0.616	0.024	0.650	0.025
11	0.661	0.026	0.720	0.028	0.725	0.029	0.729	0.028	0.740	0.029	0.757	0.030	0.745	0.029	0.786	0.030
12	0.785	0.031	0.840	0.033	0.862	0.034	0.867	0.034	0.879	0.035	0.901	0.035	0.886	0.035	0.935	0.036
13	0.921	0.036	0.960	0.037	1.011	0.040	1.017	0.040	1.031	0.041	1.056	0.042	1.039	0.041	1.096	0.043
14	1.067	0.042	1.140	0.044	1.171	0.046	1.178	0.463	1.195	0.047	1.223	0.048	1.203	0.047	1.270	0.050
15	1.223	0.048	1.320	0.051	1.343	0.053	1.351	0.053	1.370	0.054	1.403	0.055	1.380	0.054	1.456	0.057
16	1.390	0.055	1.440	0.056	1.526	0.060	1.535	0.060	1.556	0.061	1.594	0.063	1.568	0.062	1.655	0.065
17	1.567	0.061	1.680	0.066	1.720	0.068	1.730	0.068	1.755	0.069	1.797	0.071	1.768	0.069	1.866	0.073
18	1.755	0.069	1.860	0.073	1.926	0.076	1.937	0.076	1.965	0.077	2.012	0.079	1.979	0.078	2.089	0.082
19	1.952	0.077	2.100	0.080	2.143	0.084	2.155	0.084	2.186	0.086	2.238	0.088	2.202	0.086	2.324	0.091
20	2.160	0.085	2.280	0.089	2.371	0.093	2.384	0.093	2.418	0.095	2.476	0.097	2.436	0.096	2.571	0.101
21	2.377	0.093	2.520	0.099	2.609	0.103	2.624	0.103	2.662	0.105	2.725	0.107	2.681	0.105	2.830	0.111
22	2.604	0.102	2.760	0.108	2.859	0.113	2.875	0.113	2.916	0.115	2.986	0.118	2.938	0.115	3.101	0.122
23	2.841	0.112	3.000	0.118	3.119	0.123	3.137	0.123	3.182	0.125	3.257	0.128	3.205	0.126	3.383	0.133
24	3.088	0.121	3.240	0.127	3.390	0.133	3.409	0.134	3.458	0.136	3.540	0.139	3.484	0.137	3.677	0.144
25	3.344	0.132	3.540	0.139	3.671	0.145	3.692	0.145	3.745	0.147	3.834	0.151	3.773	0.148	3.982	0.156
26	3.609	0.142	3.840	0.151	3.962	0.156	3.985	0.156	4.042	0.159	4.138	0.163	4.072	0.160	4.298	0.169
27	3.884	0.153	4.080	0.160	4.264	0.168	4.288	0.168	4.350	0.171	4.453	0.175	4.382	0.172	4.625	0.182
28	4.168	0.164	4.380	0.172	4.576	0.180	4.602	0.181	4.668	0.184	4.778	0.188	4.703	0.185	4.963	0.195
29	4.461	0.175	4.740	0.186	4.897	0.193	4.925	0.193	4.996	0.197	5.114	0.201	5.033	0.198	5.312	0.209
30	4.763	0.187	5.040	0.198	5.228	0.206	5.258	0.207	5.334	0.210	5.459	0.215	5.374	0.211	5.671	0.223

CYLINDER HEAD VOLUME TESTS

CYLINDER HEAD VOLUME (Squish-Gap Method)

To check the squish gap, a micrometer and a heavy piece of solder will be needed.

1. Remove the spark plugs from the engine.
2. Insert the solder piece down through the spark plug hole and push it up against the inner cylinder bore towards the MAG-side of the engine.
3. Pull the recoil rope and crank the engine over several times while the solder is being held firmly in place.
4. Remove the solder from the cylinder. Using the micrometer, measure the very end of the squeezed solder piece. Record the reading.

■ **NOTE: If the solder hasn't been squeezed by the piston, a larger piece of solder must be used. Repeat procedure.**

5. Using the opposite end of the solder piece, insert it down through the spark plug hole towards the PTO-side of the engine. Push on the solder until it contacts the inner cylinder bore.
6. Pull the recoil rope and crank the engine over several times. Remove the solder from the cylinder and measure the squeezed end with a micrometer. Record reading and refer to the chart.

■ **NOTE: Measure from PTO to MAG-side of the piston to accurately measure the squish gap. Never measure across piston, exhaust to carburetor side, as the piston will rock and the reading won't be accurate.**

Readings may vary from side to side. Make sure the smaller reading is within the specifications listed.

CYLINDER HEAD VOLUME (CYLINDER HEAD INSTALLED METHOD)

To check the cc volume, a measuring tool called a buret will be needed. It is capable of measuring a liquid in cc volumes.

1. Fill buret with 10W engine oil.
2. Remove the spark plugs from the cylinders.
3. Run piston up to TDC (Top Dead Center).
4. Insert buret into spark plug hole and open buret valve. Run oil into the spark plug hole until it reaches the top of the spark plug hole. Turn off the buret valve.
5. Check the buret scale to see how much oil has been used to fill the combustion chamber. From the total amount, subtract 2.2 cc. Compare the findings with the chart.

■ **NOTE: The above procedure will work fine on a new engine. Engines with many hours of use, may require a small change in the procedure. In step 3, remove the cylinder head. Wipe a small amount of heavy grease around the outer diameter of the piston to seal space between the piston and cylinder bore. Replace head and tighten to specification; then continue with steps 4 and 5.**

CYLINDER HEAD VOLUME (FLAT PLATE METHOD)

The third method of checking for proper combustion chamber volume will require a 1/8 in. or 3/16 in. thick piece of plexiglass, some heavy grease, and a buret.

The plexiglass piece must be flat and also large enough to cover the entire gasket surface of the cylinder head. Using a 3/16 in. drill bit, drill two holes through the plexiglass piece. Locate the holes one inch apart inside the combustion chamber area (towards center of piece).

1. Remove the cylinder head from the engine. Clean all carbon from the combustion chamber area.
2. Position the cylinder head squarely in a vise with its gasket surface up. Leave the spark plug in place and grip the metal portion of the spark plug for holding the cylinder head.
3. Apply a light coat of grease to the gasket surface of the head. Squeeze the piece of plexiglass firmly down onto the gasket surface. The grease will act as a sealant between the two pieces.
4. Using a buret filled with light oil, fill the combustion chamber through either of the two holes drilled in the plexiglass. Continue to fill the combustion chamber until the fluid appears at the bottom of the second hole. Stop filling procedure and take a reading off the buret as to how much fluid was used. The specification found in the chart includes the spark plug volume, so there won't be any need to subtract from the reading.

CYLINDER HEAD VOLUME SPECIFICATIONS

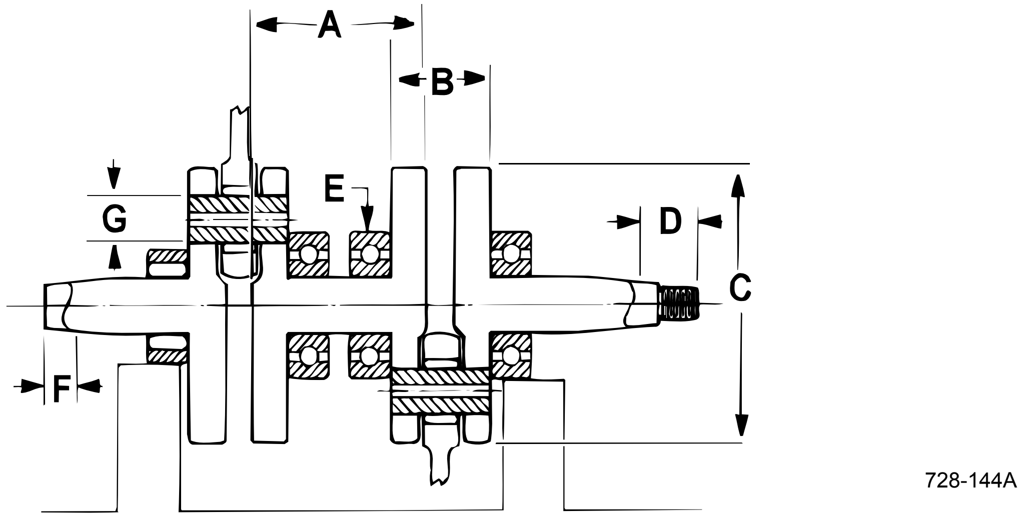
ENGINE TYPE		SQUISH - GAP		HEAD INSTALLED VOLUME (CC)	FLAT PLATE VOLUME (CC)
340 cc	1990-2000	mm in.	1.70 - 2.99 .067 - .118	16.6 - 20.1	19.5
370 cc	1999-2000	mm in.	2.27 - 2.95 .089 - .116	19.1 - 22.0	24.3 - 25.1
440 cc	1999 Z	mm in.	.91 - 2.2 .036 - .087	20.5 - 25.8	24.9
440 cc F/C	1984-2000	mm in.	1.39 - 1.87 .055 - .074	20.4 - 26.4	25.2
440 cc F/C	2000 Z (Sno-Pro)	mm in.	2.3 .090	17.8 - 19.4	24.2
500 cc F/C	1985-1990 Cougar	mm in.	1.67 - 2.79 .066 - .110	24.5 - 30.6	28.8
440 cc L/C (L/W)	1990 Pantera, Prowler 1992-1991 Cougar, Cheetah Touring	mm in.	1.32 - 2.15 .052 - .085	23.6	27
440 cc L/C (STD)	1989 El Tigre, Pantera	mm in.	1.19 - 2.00 .047 - .079	16.0 - 20.2	21.9
530 cc (DT)	1990-91 El Tigre EXT	mm in.	1.42 - 2.15 .056 - .085	26.8	33
530 cc	1986-1989 El Tigre 6000	mm in.	1.49 - 1.98 .059 - .078	21.3 - 22.8	30.5
650 cc	1988-1990	mm in.	1.52 - 1.98 .060 - .078	27.7 - 29.5	39.3
700 cc	1991-1995 (Carb) 1999-2000	mm in.	1.76 - 2.32 .069 - .091	29.6 - 33.4	43.2
700 cc	1991-1996 (EFI)	mm in.	1.93 - 2.18 .076 - .086	32.4 - 35.7	45.6
440 cc L/C (L/W)	1996 Jag, Panther 1997-1999 ZL	mm in.	1.29 - 2.15 .051 - .084	21.2	25.7
440 cc L/C (L/W)	1991-1993 Prowler Special	mm in.	1.52 - 2.15 .060 - .085	20.4	26.3
440 cc (L/W)	1991-1992 Prowler, Pantera 1993 Prowler, 1993-94 Cougar	mm in.	1.29 - 2.13 .051 - .084	21.2	25.7
550 cc	1993-2000	mm in.	1.52 - 2.00 .060 - .079	27.7 - 29.9	33.7 - 34.7
580 cc	1993-2000	mm in.	1.47 - 2.01 .057 - .079	25.3	35.5
900 cc	1993-1997 Thundercat	mm in.	1.78 - 2.15 .070 - .085	23.3 - 28.5	36.4
440 cc L/C (L/W)	1994 Prowler EFI	mm in.	1.29 - 2.15 .051 - .084	21.2	25.7
440 cc L/C	1994 ZR	mm in.	1.52 - 2.16 .060 - .085	20.4	26.3
800 cc	1995-2000	mm in.	1.46 - 2.01 .057 - .079	22.4	31.3
600 cc	1995-2000 (Triple)	mm in.	1.00 - 1.59 .039 - .062	17.4 - 19.5	18.5
440 cc	1997 ZR	mm in.	.94 - 1.67 .037 - .066	16 - 18	17.2
440 cc	1995-1996 ZR	mm in.	1.52 .060	17.7 - 19.7	15.7 - 17.7
440 cc	1998 ZR (Consumer Model)	mm in.	1.09 - 1.82 .043 - .072	16.6 - 18.6	17.8
500 cc	1998 -2000 (Twin)	mm in.	1.3 .051	19.4 - 21.9	20.8
600 cc	1998 -2000 (Twin)	mm in.	1.48 .058	26.9 - 29.6	28.4
1000 cc	1998 - 2000	mm in.	1.99 .078	28.4 - 31.7	37.7

■ **NOTE: For accurate reading when using the head installed volume method, subtract 2.2 cc from the total amount of fluid used.**

⚠ CAUTION

The above specifications are not intended to be used for engine modification. Reducing the head volume to the smaller specification could cause piston detonation problems which is not a warranty situation.

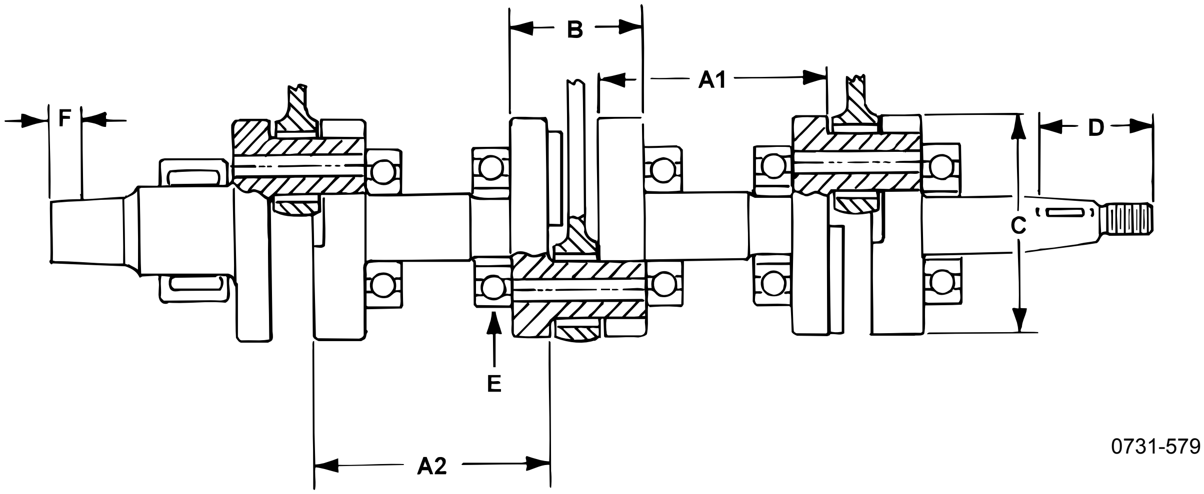
CRANKSHAFT RUNOUT SPECIFICATIONS



Model	Bore X Stroke	A	B	C	G	Runout D, E, F Point
370 F/C* 440 F/C-CI AF44A mm AK44A (in.)	60 X 65* 65 X 65	100 ± 0.15 (3.937 ± 0.0006)	55 ± 0.15 (2.165 ± 0.006)	100 (3.937)	22 (.866)	(± .002) D 35 (1.377) F 22 (.866)
55O L/C-E mm AH50L (in.)	70 X65	103 ± 0.02 (4.055 ± 0.0007)	60 ± 0.02 (2.362 ± 0.0007)	102 (4.015)	24 (.944)	(± .002) D 30 (1.181) F 10 (.393)
60 F/C AA06A mm (in.)	41 X 45	— —	34 ± 0.02 (1.339 ± 0.001)	74 (2.913)	16 (.629)	(± .002) D 32.5 (1.279) F 26 (1.023)
340 F/C-CI AF34A mm (in.)	60 X 60	93 ± 0.15 (3.661 ± 0.006)	53 ± 0.15 (2.087 ± 0.006)	94 (3.701)	22 (.866)	(± .002) D 35 (1.377) F 15 (.590)
500 F/C-CCI AL50A mm (in.)	70 X 65	103 ± 0.02 (4.055 ± .0007)	55 ± 0.02 (2.165 ± 0.0007)	100 (3.937)	22 (.866)	(± .002) D 35 (1.377) F 15 (.590)
500 F/C-E AM50A mm (in.)	70 X 65	103 ± 0.02 (4.055 ± .0007)	55 ± 0.02 (2.165 ± 0.0007)	100 (3.937)	22 (.866)	(± .002) D 35 (1.377) F 15 (.590)
440 L/C-CI AH44L mm (in.)	68 X 60	103 ± 0.02 (4.055 ± .0007)	60 ± 0.2 (2.362 ± 0.007)	102 (4.015)	24 (.944)	(± .002) D 30 (1.181) F 10 (.393)
530 L/C AA53L mm (in.)	72 X 65	103 ± 0.02 (4.055 ± 0.008)	60 ± 0.2 (2.362 ± 0.008)	102 (4.015)	24 (.945)	(± .002) D 30 (1.181) F 10 (.393)
650 L/C 700 L/C* mm (in.)	78 X 68 81 X 68*	130 ± 0.15 (5.118 ± .006)	64 ± 0.15 (2.520 ± 0.006)	116 ± 0.2 (4.567 ± 0.007)	28 (1.102)	(± .002) D 35 (1.377) F 15 (.590)
440 L/C-LW AJ44L mm (in.)	68 X 60	108.5 ± 0.15 (4.271 ± 0.006)	55 ± 0.15 (2.165 ± 0.006)	95 ± 0.4 (3.740 ± .015)	22 (.866)	(± .002) D 30.5 (1.200) F 10 (.393)
550 L/C 580 L/C mm (in.)	73.4 X 65	112.5 ± 0.15 (4.409 ± 0.006)	60 ± 0.15 (2.362 ± 0.006)	106 (4.174)	26 (1.024)	(± .002) D 30 (1.181) F 5 (.197)
440 L/C-LWR mm (in.)	68 X 60	109.5 ± 0.15 (4.311 ± 0.006)	60 ± 0.15 (2.362 ± 0.006)	106 (4.173)	24 (0.945)	(± .002) D 30 (1.181) F 5 (.197)
440 L/C-ZR AR44L1 mm (in.)	66.5 X 63	114 ± 0.16 (4.48 ± 0.006)	66.5 ± 0.15 (2.62 ± 0.006)	106 (4.173)	26 (1.024)	(± .002) D 30 (1.181) F 5 (.197)
500 L/C 600 L/C* mm (in.)	71 X 62.7 78 X 62.7*	114 ± 0.15 (4.88 ± 0.006)	66.5 ± 0.15 (2.62 ± 0.006)	105.8 - 106 (4.165 - 4.173)	30 (1.2)	(± .002) D 30 (1.181) F 5 (.197)

■ **NOTE: Measure in from the shaft end the specified amount when checking runout at points D-F. When checking runout in the center, place indicator on center of bearing as shown at Point E. Maximum runout at any of the 3 measuring points is ±0.05 mm (0.002 in.).**

CRANKSHAFT RUNOUT SPECIFICATIONS (cont)



Model	Bore X Stroke	A	B	C	G	Runout D, E, F Point	
						(± .002)	
600 L/C (Triple Cyl) mm (in.)	66.5 X 57	A1 102.8 ± 0.15 (4.047 ± 0.006) A2 105.3 ± 0.15 (4.145 ± 0.0006	58 ± 0.15 (2.303 ± 0.0006)	99 ± 0.15 (3.897 ± 0.0006)	26 (1.023)	D 30 (1.181)	F 15 (.590)
						(± .002)	
800 L/C mm (in.)	72 X 65	A1 & A2 124.4 ± 0.015 (4.897 ± 0.0006)	64 ± 0.15 (2.519 ± 0.0006)	112 ± 0.15 (4.409 ± 0.0006)	30 (1.181)	D 5 (.197)	F 15 (.590)
						(± .002)	
900 L/C mm (in.)	76 X 65	A1 & A2 124.4 ± 0.15 (4.897 ± 0.0006)	64 ± 0.15 (2.519 ± 0.0006)	112 ± 0.15 (4.409 ± 0.0006)	30 (1.181)	D 5 (.197)	F 15 (.590)
						(± .002)	
1000 L/C mm (in.)	81 X 64.6	124.4 ± 0.15 (4.900 ± 0.006)	64 ± 0.15 (2.520 ± 0.006)	111.8 - 112 (4.402 - 4.409)	26 (1.0236)	D 30 (1.181)	F 5 (0.197)

■ **NOTE: Measure in from the shaft end the specified amount when checking runout at points D-F. When checking runout in the center, place indicator on center of bearing as shown at Point E. Maximum runout at any of the 3 measuring points is ±0.05 mm (0.002 in.).**

CRANKSHAFT REPAIR

For those who have crankshaft work sent out to another shop, it is advisable to provide them with this information.

To use the specifications on pages 6-5 and 6-6, first refer to the drawing. Find the letter which indicates the specification and then refer to the chart below the illustration. Be sure to note the proper engine column. Specifications are called out in both millimeters and inches.

■ **NOTE: For the past several years, we have always given the proper location for checking crankshaft runout as the very edge of the straight portion of the shaft where the oil seal makes contact. From the drawings on the pages 6-5 and 6-6, note that Suzuki has called out three check points: At either end, out on the taper as shown, and also on the center bearing race. The crankshaft is still supported on the outer bearings using V blocks. The maximum runout shouldn't exceed 0.05 mm (0.002 in.).**

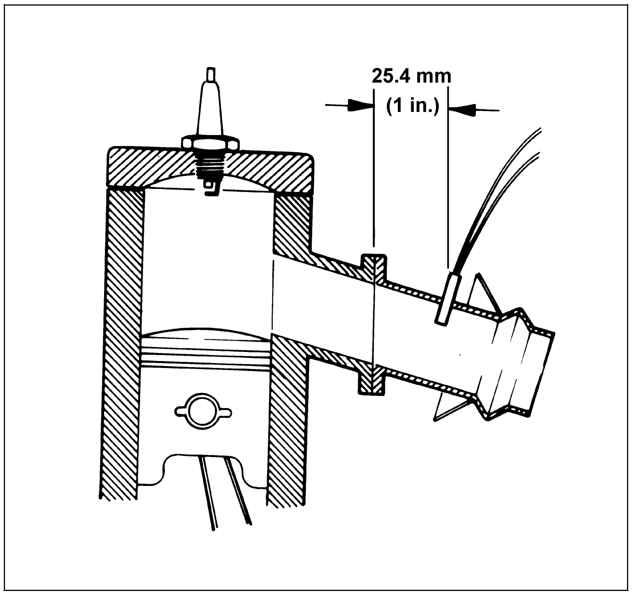
■ **NOTE: Engines that have a crankshaft failure during the warranty period must have the crankshaft replaced and not repaired.**

EXHAUST GAS TEMPERATURE

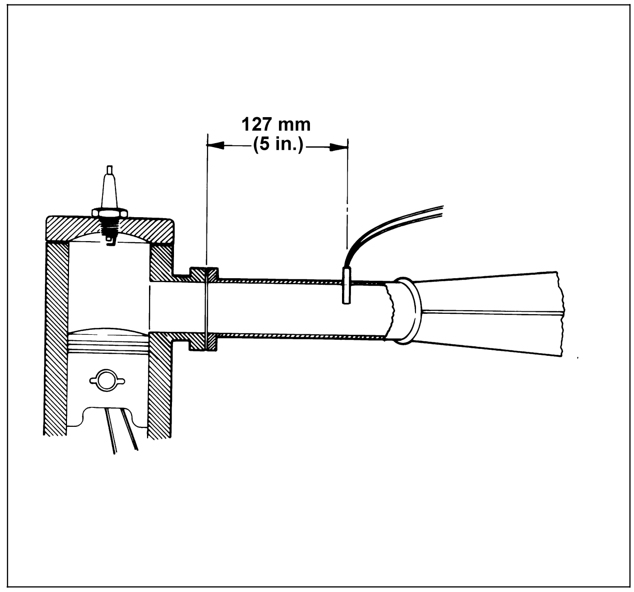
MODEL	PROBE LOCATION**		NORMAL		PRE-IGNITION	
	in.	mm	°F	°C	°F	°C
Wildcat (89-96), ZR 700 (94-95, 99-2000) Powder Special 700 (99-2000)	1**	25.4	1120	604	1180	638
El Tigre 6000 (87-89)	1**	25.4	1200	649	1300	705
El Tigre EXT (90-91)	1**	25.4	1160	627	1250	677
El Tigre EXT (89)	1**	25.4	1105	596	1200	649
Prowler (90-94)	1**	25.4	1150	621	1250	677
Pantera (90-92)	1**	25.4	1150	621	1250	677
EXT 550 EFI (93), Prowler (95), Pantera (93-94)	1**	25.4	1150	621	1250	677
Jag Z (92-94), Z 440 (95-2000), Bearcat 440 (95-2000)	1**	25.4	1086	586	1100	593
Prowler Special (91-92), ZR 440 (94-98)	1**	25.4	1150	621	1250	677
Jag 440 (86-89)	1**	25.4	1112	600	1200	649
Cougar (88-90)	1**	25.4	1230	666	1250	677
Cougar (91-94), ZL 440 (97-2000) Jag & Panther L/C (96)	1**	25.4	1150	621	1250	677
Panther (88)	1**	25.4	1230	666	1300	705
EXT 550 (91-93), Bearcat 550 (95-2000), Cougar (95-98), Cheetah 550 (94), Panther 550 (99-2000)	1**	25.4	1150	621	1250	677
Jag 440 F/C (90-2000)	1**	25.4	1150	621	1250	677
Panther 440 F/C (89-2000)	1**	25.4	1150	621	1250	677
EXT 580 Z (93), ZR 580 (94-97), EXT 580 (95-98), Pantera 580 (95-2000)	1**	25.4	1150	621	1250	677
Thundercat 900 (93-97), ZRT 800 (95-2000), Pantera 800 (99-2000)	5**	127	1230	666	1300	705
ZRT 600 (95-2000) (3 cyl), Triple Touring 600 (99-2000)	2.5**	63.5	1200	649	1350	732
ZL 500 (98-2000), ZR 500 (98-2000), Powder Special 500 (99-2000)	3.937*	100*	1055	568	1100	593
Powder Special 600 (99-2000), ZL 600 (99-2000), ZR 600 (98-2000)	3.937*	100*	1115	602	1200	649
Thundercat 1000 (98-2000)	3.937*	100*	1175	635	1250	677
Z 370 (99-2000)	1**	25.4	1086	586	1100	593

* Measuring from the piston skirt out.
** Probe location measured down the exhaust manifold from the gasket surface of the flange.

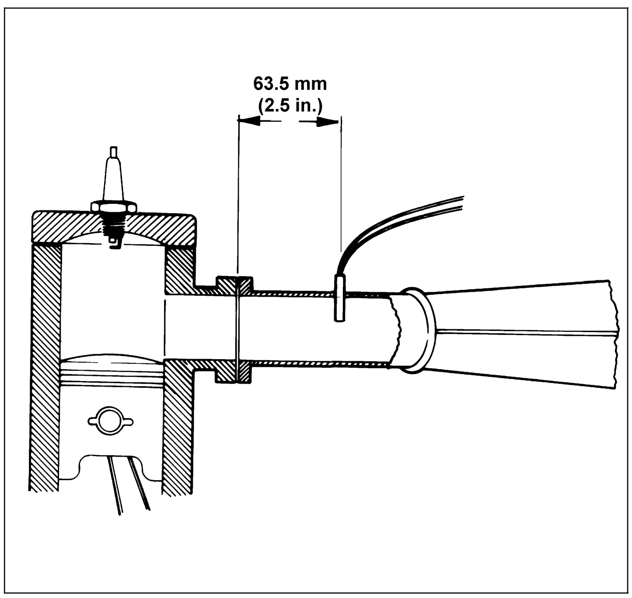
EXHAUST GAS TEMPERATURE PROBE LOCATION



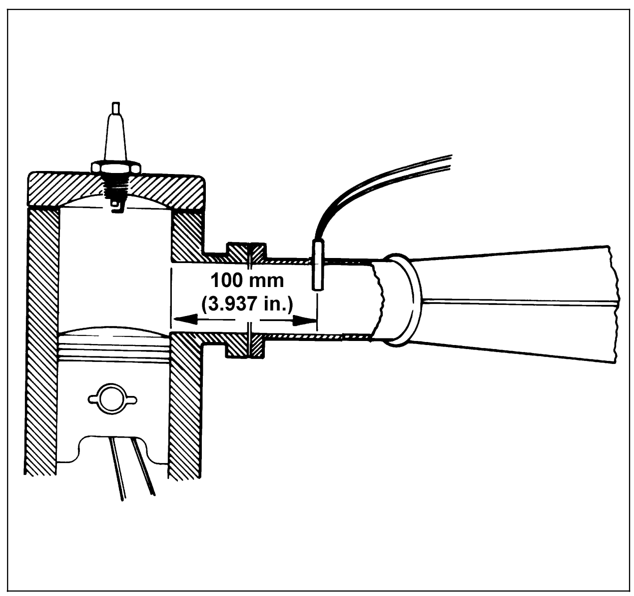
0730-217



0730-216



730-216A



730-216B

■ **NOTE: Refer to Exhaust Gas Temperature chart (page 2-145) for specific MODEL designation and PROBE LOCATION specifications.**

SECTION 3 — ENGINE-RELATED ITEMS

3

TABLE OF CONTENTS

Axial Fan/Belt 3-2
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Repairing Water Pump (800/1000 cc) 3-11
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Liquid Cooling System 3-14
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Axial Fan/Belt

REMOVING FAN

1. Remove the four cap screws securing the recoil starter to the fan case.

2. Remove the three cap screws securing the recoil starter pulley and fan drive pulley to the flywheel; then remove the recoil starter pulley and fan drive pulley.

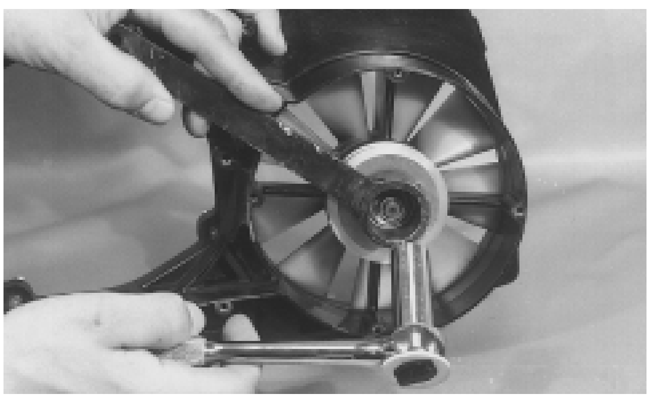
3. Remove the three cap screws and four flange nuts securing the fan case assembly to the engine; then remove the fan case from the engine compartment.

DISASSEMBLING

1. Remove the fan cover; then remove the belt.

2. Using the Fan Spanner Wrench (p/n 0644-139), remove the nut, lock washer, and washer securing pulley halves.

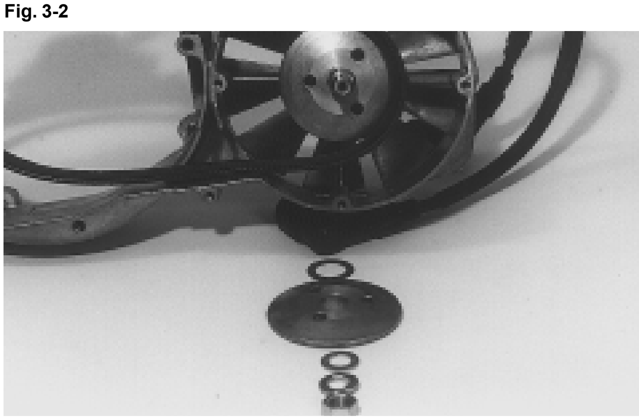
Fig. 3-1



AB102

3. Slide the outer pulley half, shim(s), fan belt, and inner pulley half off the shaft and account for the key and the fan belt.

Fig. 3-2

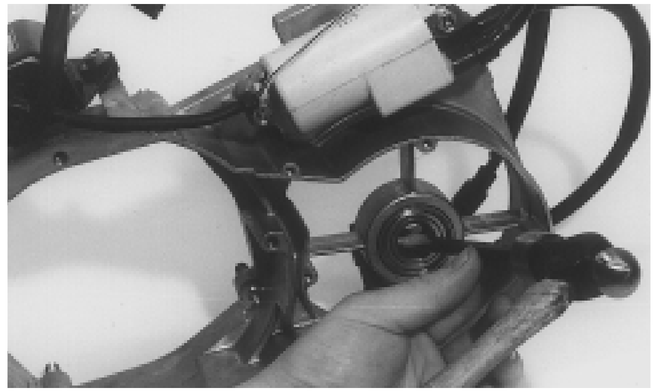


A908

4. Remove the fan with shaft.

5. Drive the bearings from the fan case and account for the spacer between the bearings.

Fig. 3-3



A910

■NOTE: A circlip is positioned between the bearings. The bearings must be driven from the center to the outside of the fan case.

6. Remove the circlip from the fan case.

Fig. 3-4



A911

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all axial fan components.

2. Inspect the fan case and shaft threaded areas for damage or stripped threads; then check the shaft keyway and key for excessive wear.

3. Inspect the fan for broken, bent, or damaged vanes.

4. Inspect the bearings for smooth rotation.

5. Inspect the pulley halves for cracks, gouges, or other damage.

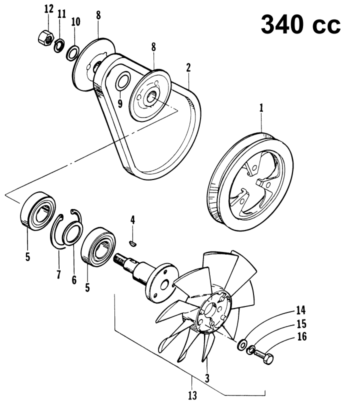
6. Inspect the fan belt for cracks, tears, or fraying.

ASSEMBLING

Fig. 3-5

KEY
1. Drive Pulley
2. Belt
3. Fan
4. Key
5. Bearing
6. Spacer
7. Circlip
8. Pulley Half
9. Shim
10. Washer
11. Lock Washer
12. Nut
13. Shaft/Fan Assy
14. Washer
15. Lock Washer
16. Cap Screw

340 cc

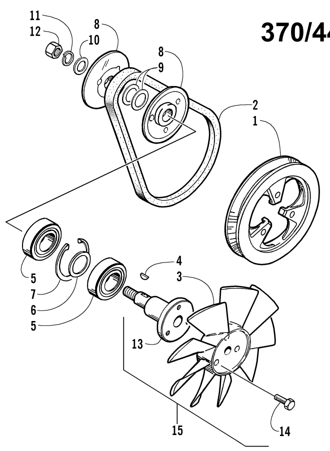


0731-820

Fig. 3-6

KEY
1. Drive Pulley
2. Belt
3. Fan
4. Key
5. Bearing
6. Spacer
7. Circlip
8. Pulley Half
9. Shim
10. Washer
11. Lock Washer
12. Nut
13. Shaft
14. Cap Screw
15. Fan Assy

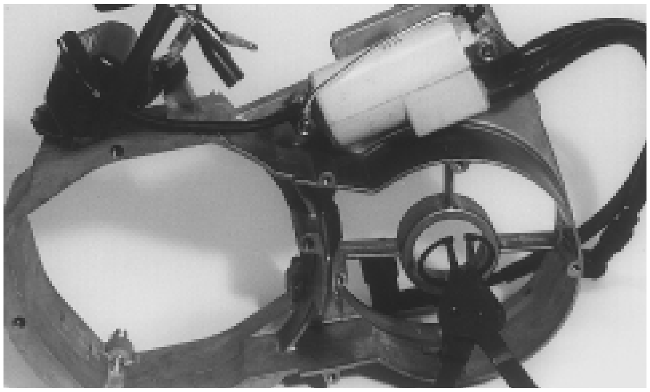
370/440 cc



0733-277

1. Install the circlip into the groove of the fan case.

Fig. 3-7



A911

2. Press a bearing into the fan case until it is “seated” against the circlip.

3. From the opposite side of the fan case, install the spacer and press the remaining bearing into the fan case until it is “seated.”

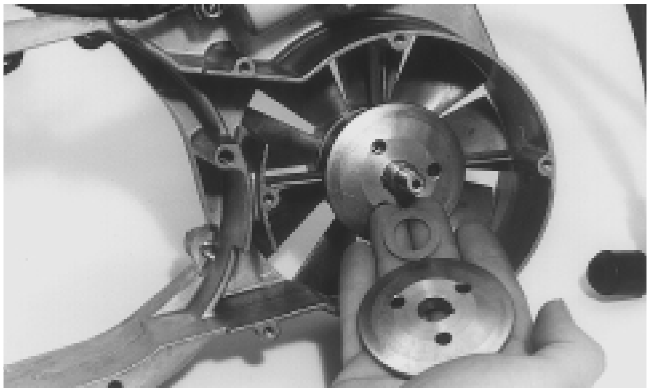
■ **NOTE: The spacer is positioned between the two fan-case bearings.**

4. Insert the fan with shaft through the fan bearings.

5. Install the key into the shaft.

6. Slide the inner pulley half, required shim(s), fan belt, and outer pulley half onto the shaft.

Fig. 3-8



A913

7. Using the fan spanner wrench, secure the pulley with a washer, lock washer, and nut. Tighten the nut to 2.5-4 kg-m (18-29 ft-lb).

INSTALLING FAN

1. Place the fan case assembly on the engine; then secure with four flange nuts and three cap screws. Tighten the flange nuts and 8 mm cap screw to 1.8-2.2 kg-m (13-16 ft-lb). Tighten the 6 mm cap screws to 0.8-1.2 kg-m (6-9 ft-lb).

2. Place the new fan belt into position on the upper pulley.

3. Place the fan drive pulley onto the fan belt and align one of its holes with one of the mounting holes in the flywheel; then start a cap screw into the aligned holes and finger-tighten.

4. Rotate the fan drive pulley clockwise while observing the other two holes in the pulley. When they align with the two holes in the flywheel, start the remaining two mounting cap screws.

5. Tighten the three cap screws only to position the fan drive pulley on the flywheel; then remove the three cap screws and install the recoil starter pulley. Apply red Loctite #271 to the threads of the three cap screws and install them into the flywheel. Tighten the three cap screws evenly to 0.8-1.2 kg-m (6-9 ft-lb).

6. Check the fan belt tension. Adjust as necessary.

7. Install the fan cover and secure with six screws.

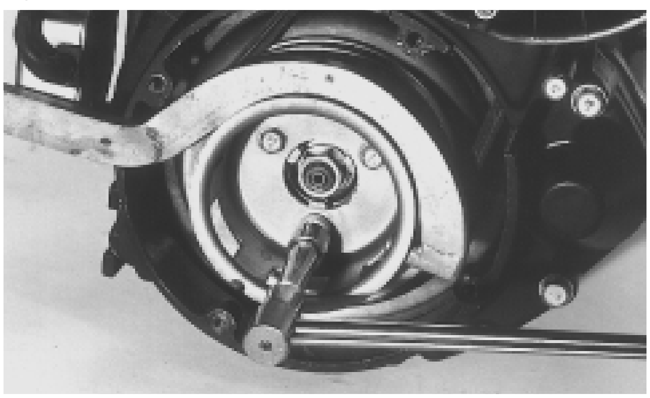
8. Install the recoil starter. Secure with four cap screws.

3

REPLACING FAN BELT

1. Remove the fan cover and the recoil starter.
2. Remove the three cap screws securing the recoil starter pulley and the fan drive pulley to the flywheel.
3. Remove the fan drive pulley and fan belt from the engine.
4. Place the new fan belt into position on the upper pulley.
5. Place the fan drive pulley onto the fan belt and align one of its holes with one of the mounting holes in the flywheel; then start a cap screw into the aligned hole and finger-tighten.
6. Rotate the fan drive pulley clockwise while observing the other two holes in the pulley. When they align with the two holes in the flywheel, start the remaining two cap screws.
7. Tighten the three cap screws only to position the fan drive pulley on the flywheel; then remove the three cap screws and install the recoil starter pulley. Apply red Loctite #271 to the threads of the three cap screws and install into the flywheel. Tighten the three cap screws evenly to 0.8-1.2 kg-m (6-9 ft-lb).

Fig. 3-9



AB040

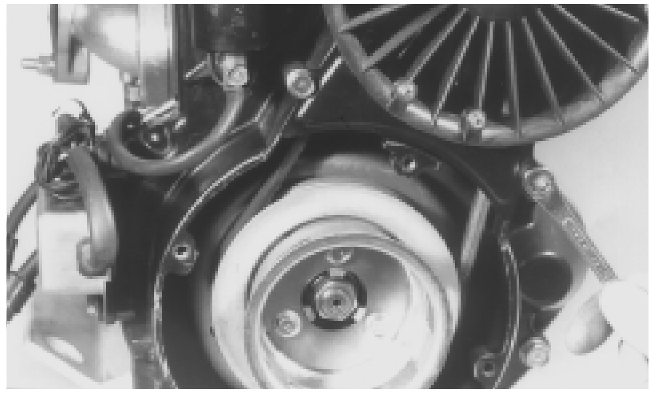
■ **NOTE: With the new belt installed, check fan belt tension (see Checking Belt Tension).**

8. Install the fan cover and recoil starter.

CHECKING BELT TENSION

1. Remove the fan cover.

Fig. 3-10



AB075

2. Squeeze the belt at midspan and observe the belt deflection. The maximum belt deflection on either side must not exceed 6 mm (1/4 in.). If the deflection is not within specifications, adjust the belt tension.

Fig. 3-11



B075

3. Install the fan cover.

ADJUSTING BELT TENSION

1. Remove the fan cover.
2. Using the fan spanner wrench, remove the nut, lock washer, and washer securing the pulley halves.
3. Slide the outer pulley half off the shaft and account for any shim(s).
4. Add or remove shim(s) to attain correct belt tension.

■ **NOTE: To increase belt tension, remove shim(s); to decrease belt tension, install shim(s).**

5. Install the fan belt and the outer pulley half on the shaft and, using the fan spanner wrench, secure pulley with a washer, lock washer, and nut. Tighten to 2.5-4 kg-m (18-29 ft-lb).
6. Recheck belt tension; adjust if necessary.
7. Install fan cover.

Repairing Water Pump (Twin)

■ **NOTE: A bleed hole is located at the bottom of the water pump housing. If there are any signs of coolant leakage from the bleed hole, the water pump seals must be replaced. When servicing the water pump, use Water Pump Bearing and Seal Kit (p/n 0644-084).**

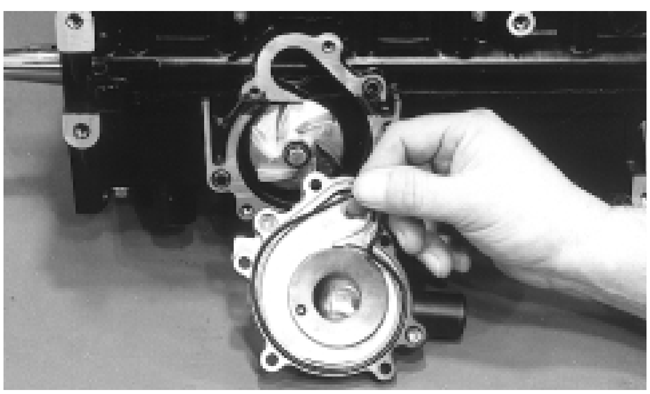
1. Remove the expansion chamber from the engine compartment.

2. Attach a long piece of fuel hose to the engine coolant drain valve (located on the front lower half of the crankcase). Route the fuel hose outside the engine compartment and into a container. Open the drain valve and remove the filler cap. Once the coolant stops flowing, remove the hose and tighten the drain valve.

3. Remove the coolant hose from the water pump cover.

4. Remove the screws securing the water pump cover; then remove the cover and account for the O-ring seal.

Fig. 3-12



AN180

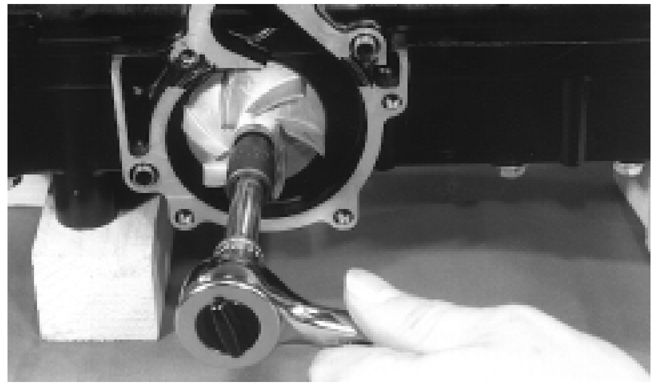
5. Loosen the throttle body/carburetor flange clamps; then remove the throttle body/carburetors.

6. Remove the mounting hardware securing the engine to the front-end assembly. Remove the hose from the thermostat housing and tip the engine forward.

7. Remove either lower union cap screw securing the lower check valve assembly. Remove the two screws securing the oil-injection pump and pull the oil pump from the engine. Leave the pump hose and cable attached.

8. Remove the cap screw securing the impeller.

Fig. 3-13

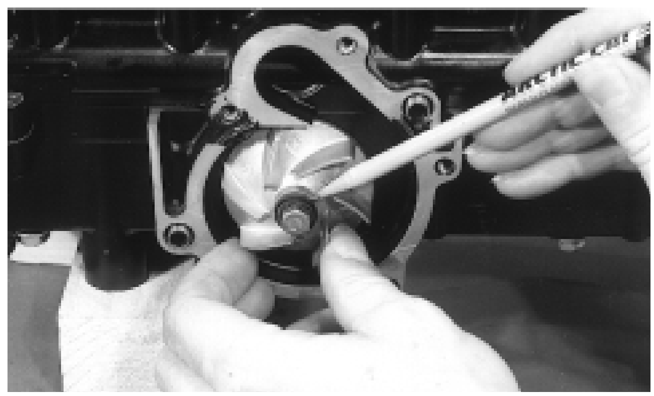


AN233

9. Remove the impeller from the shaft.

■ **NOTE: If the impeller won't slide off the shaft, start the cap screw into the shaft and tap on the cap screw driving the shaft back out of the impeller.**

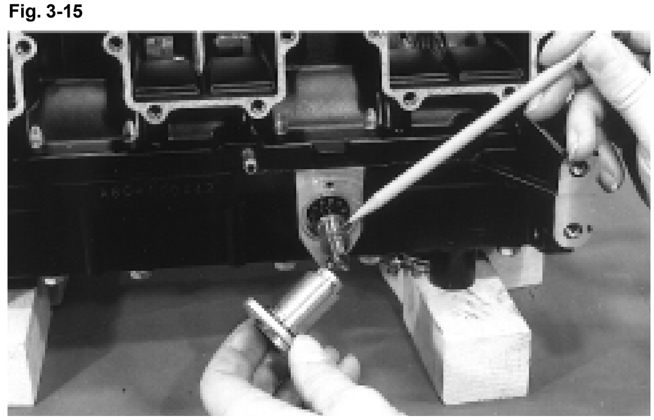
Fig. 3-14



AN232

10. Remove the oil-injection pump retainer and shaft from the opposite side of the crankcase. Account for the thrust washer located between the retainer and shaft flange.

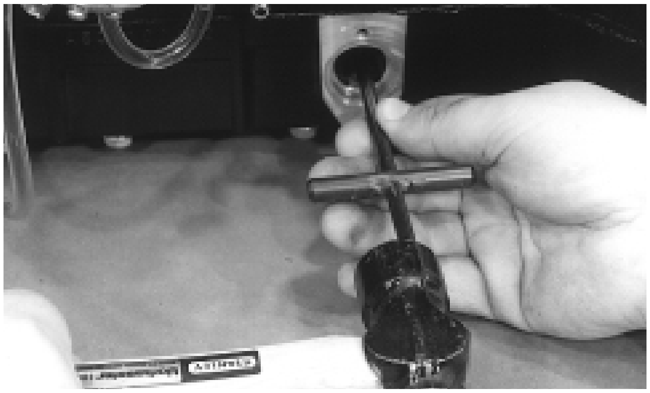
Fig. 3-15



AN231

11. Using the long seal driver, drive the water pump seal from the crankcase.

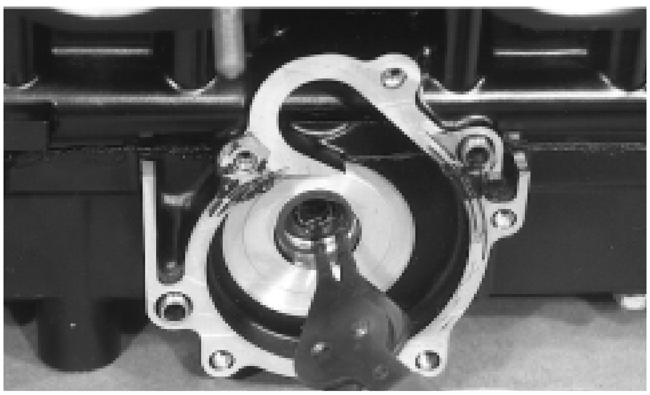
Fig. 3-16



AN250

12. Using a pair of snap ring pliers, remove the snap ring securing the inner seal in the crankcase.

Fig. 3-17



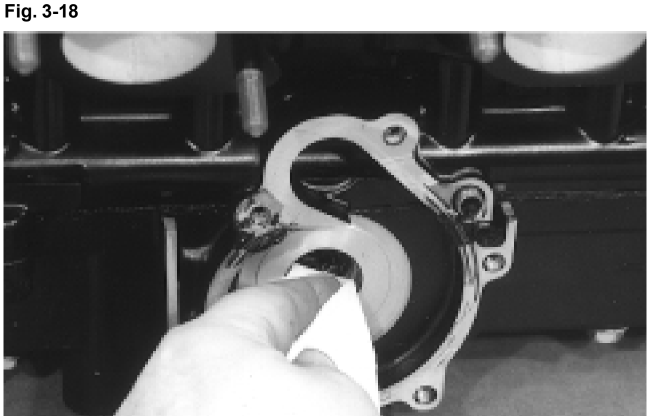
AN249

13. Using the hooked end of the long seal driver, pull the inner seal free of the crankcase.

ASSEMBLING

1. Wipe the seal area clean using a clean rag.

Fig. 3-18



AN248

2. Position the inner seal onto the seal driver (spring side towards the crankshaft). Gently tap into position.

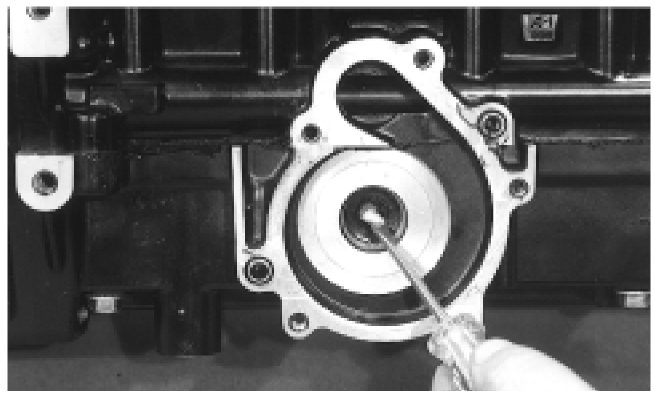
Fig. 3-19



AN259

3. Using a small screwdriver, apply a light coat of grease to the inner seal lips.

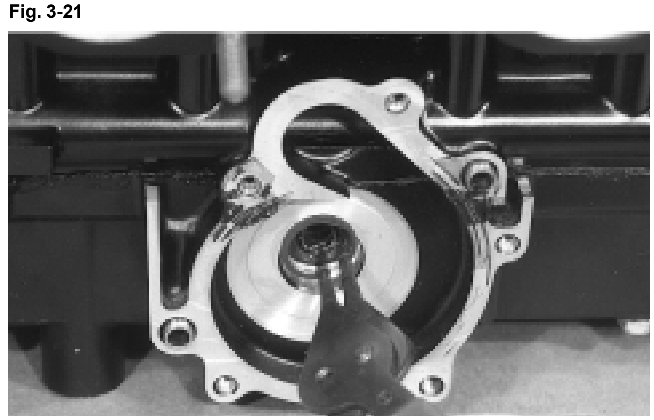
Fig. 3-20



AN262

4. Using a pair of snap ring pliers, install the snap ring securing the inner seal in the crankcase.

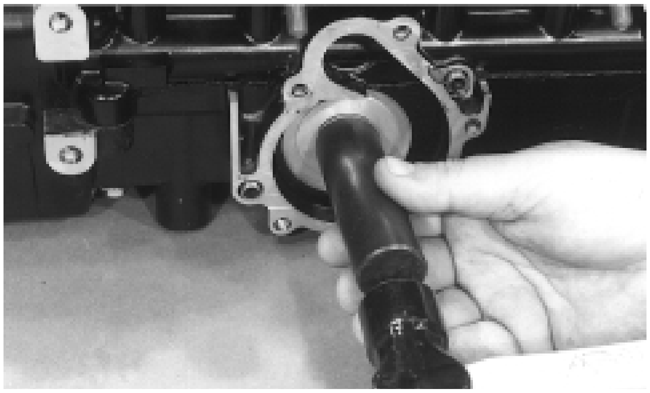
Fig. 3-21



AN249

5. Using the seal driver, carefully install the outer water pump seal. Gently tap the seal down into position until it seats itself against its flange.

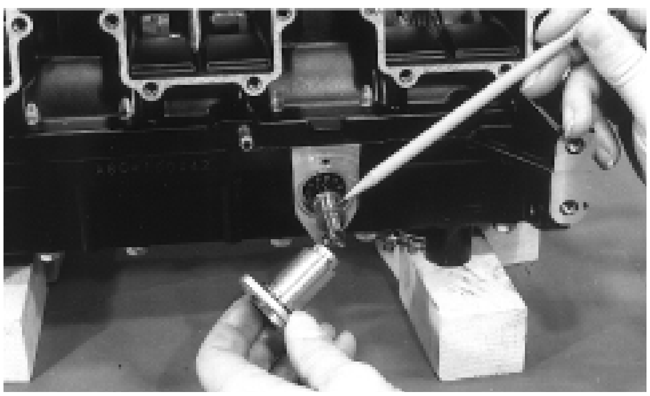
Fig. 3-22



AN261

6. Apply a light coat of grease to the sealing surface of the oil-injection pump driveshaft; then install Oil Seal Installation Tool (p/n 0644-219) at the end of the shaft. Twist the shaft as it is pushed through the oil and water pump seals; then remove the tool. Position the shim on the oil pump end of the shaft.

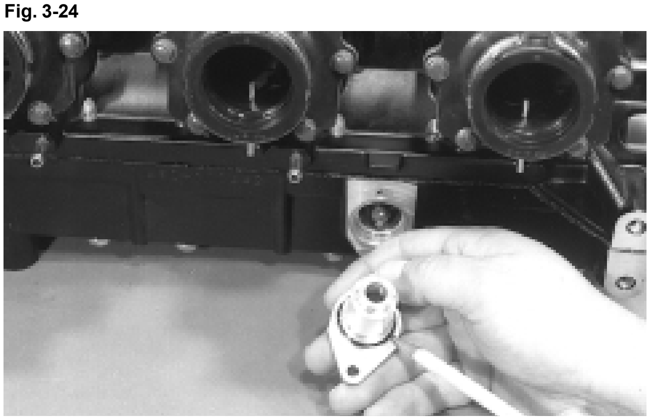
Fig. 3-23



AN231

7. Install the oil-injection pump retainer O-ring and retainer.

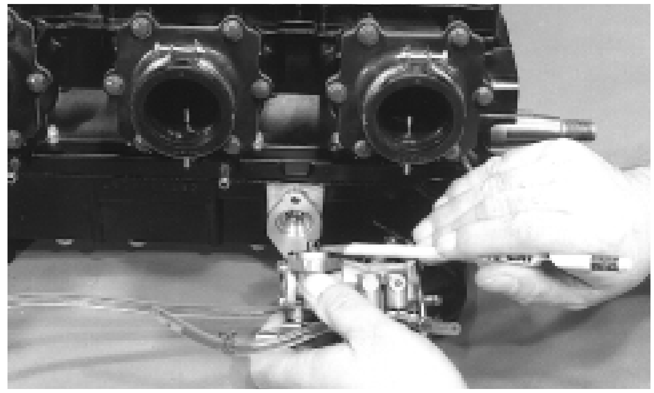
Fig. 3-24



AN184

8. Install the O-ring and the oil-injection pump. Make sure the pump shaft and oil pump align. Secure with two screws and washers. Tighten the two screws to 0.7 kg-m (5 ft-lb).

Fig. 3-25

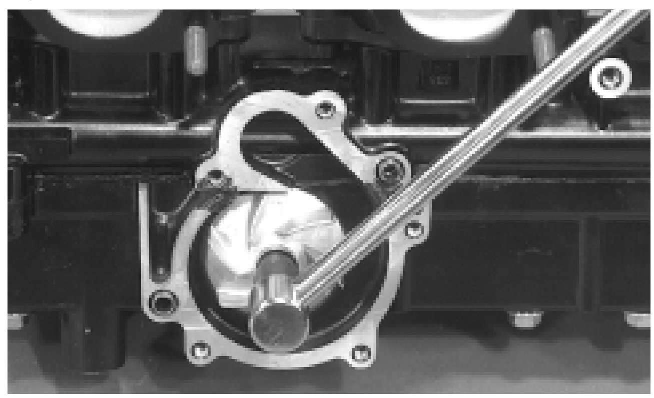


AN183

9. Place the lower check valve into position; then secure with the gaskets and union cap screw. Tighten securely.

10. Place the impeller into position and secure with a cap screw and washer. Be sure the rubber side of the washer is directed towards the impeller. Apply blue Loctite #242 to the threads of the cap screw and tighten to 0.8-1.2 kg-m (6-9 ft-lb).

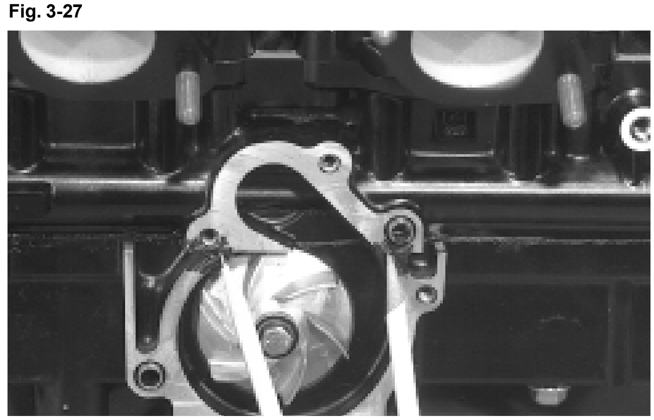
Fig. 3-26



AN178

11. Apply sealant to the crankcase seam; then install the alignment pins into the crankcase (if removed).

Fig. 3-27

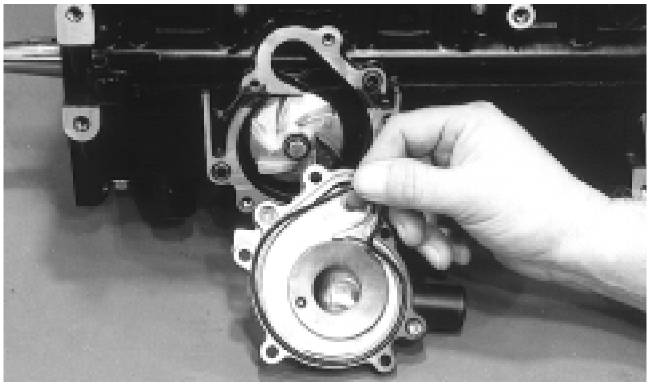


AN179

12. Position the O-ring into the water pump cover; then install the cover. Secure with the screws. Tighten to 1.1 kg-m (8 ft-lb).

3

Fig. 3-28



AN180

13. Set the engine down into position and secure to the front-end assembly. Tighten to specifications.

14. Connect the coolant hose to the water pump cover and secure with the clamp.

15. Install the throttle body/carburetors and secure with clamps.

16. Install the expansion chamber and secure with springs.

■ **NOTE: When installing the springs, the long hook portion of the spring must be attached to the exhaust manifold or premature spring failure will result.**

17. Install the thermostat hose and fill the cooling system with antifreeze. Start and run the engine. Check for leaks and recheck the cooling system to make sure it has been properly filled.

Repairing Water Pump (600 cc Triple)

REMOVING AND DISASSEMBLING

■ **NOTE: A bleed hole is located at the bottom of the water pump housing. If there are any signs of coolant leakage from the bleed hole, the water pump seals must be replaced. When servicing the water pump, use Water Pump Bearing and Seal Kit (p/n 0644-084).**

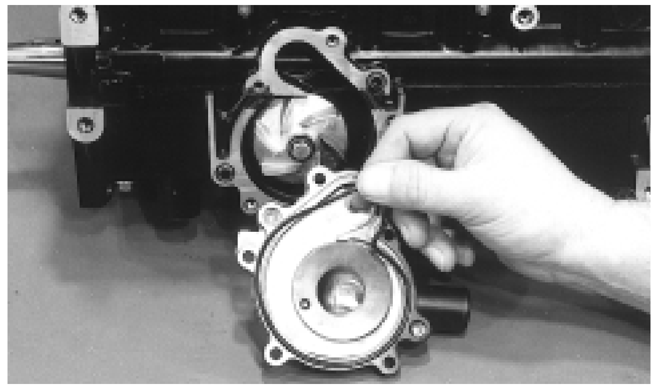
1. Mark the three expansion chambers for assembly purposes; then remove the expansion chambers from the engine compartment.

2. Attach a long piece of fuel hose to the engine coolant drain (located on the front lower half of the crankcase). Route the fuel hose outside the engine compartment and into a container. Open the drain and remove the filler cap. Once the coolant stops flowing, remove the hose and tighten the drain valve.

3. Remove the coolant hose from the water pump cover.

4. Remove the water pump cover and account for the O-ring seal.

Fig. 3-29



AN180

5. Mark the three carburetors for assembly purposes. Loosen the carburetor flange clamps; then remove the three carburetors and lay to the side.

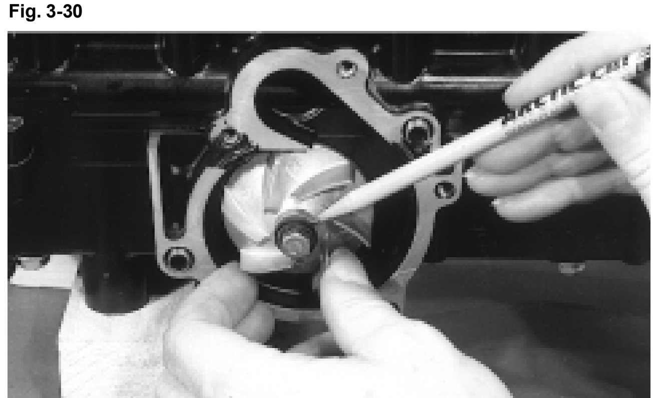
6. Remove the cap screws securing the engine to the front-end assembly. Remove the hose from the thermostat housing and tip the engine forward.

7. Remove the screws securing the oil pump and pull the oil pump from the engine. Leave the oil pump hose and cable attached.

8. Remove the cap screw securing the impeller.

9. Pull the impeller from the shaft. If the impeller won't slide off the shaft, start the cap screw into the shaft and tap on the cap screw driving the shaft back out of the impeller.

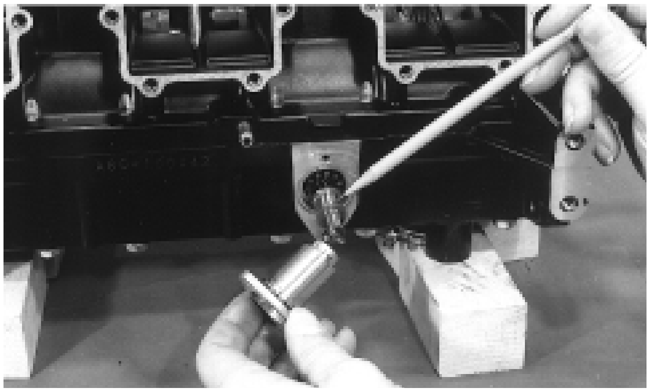
Fig. 3-30



AN232

10. Remove the oil pump retainer and shaft from the opposite side of the crankcase. Account for the thrust washer located between the retainer and shaft flange.

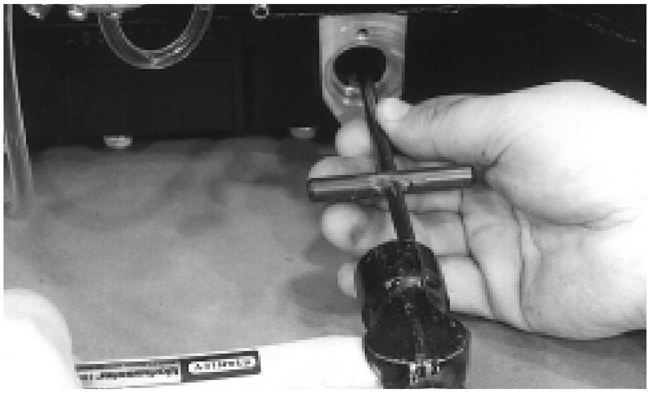
Fig. 3-31



AN231

11. Using the long seal driver, drive the water pump seal from the crankcase.

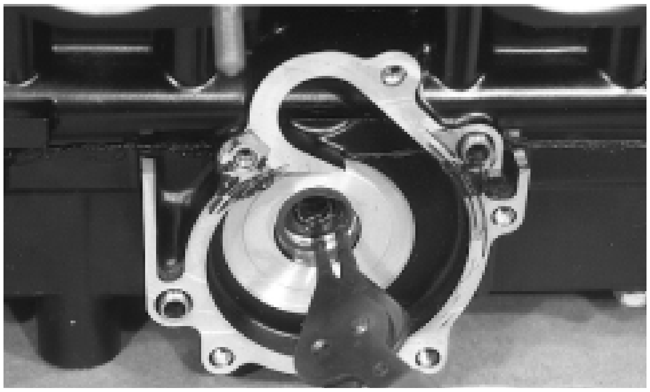
Fig. 3-32



AN250

12. Remove the snap ring securing the inner seal in the crankcase.

Fig. 3-33



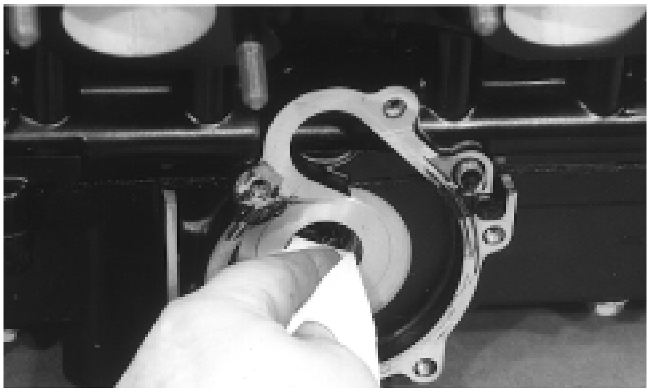
AN249

13. Using the hooked end of the long seal driver, pull the inner seal free of the crankcase.

ASSEMBLING AND INSTALLING

1. Wipe the seal area clean using a clean rag.

Fig. 3-34



AN248

2. Position the inner seal onto the seal driver (spring side towards the crankshaft). Gently tap into position.

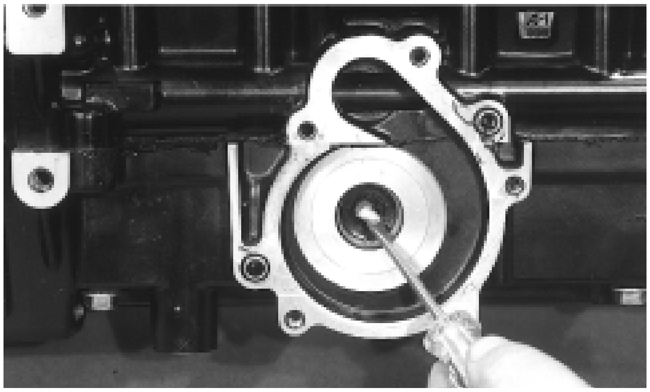
Fig. 3-35



AN259

3. Apply a thin coat of grease to the inner seal lips.

Fig. 3-36

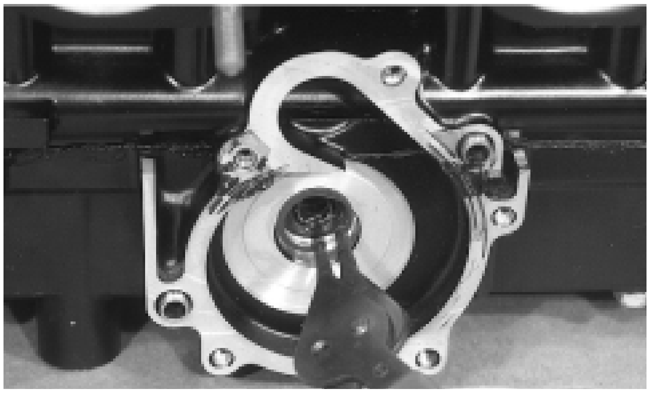


AN262

4. Install the snap ring securing the inner seal in the crankcase.

3

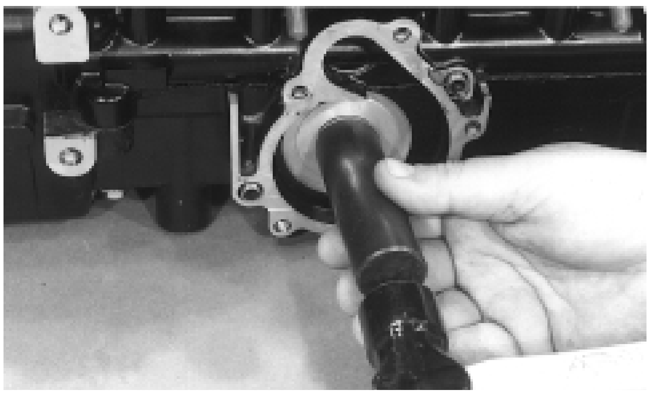
Fig. 3-37



AN249

5. Using the seal driver, carefully install the outer water pump seal. Gently tap the seal down into position until it seats itself against its flange.

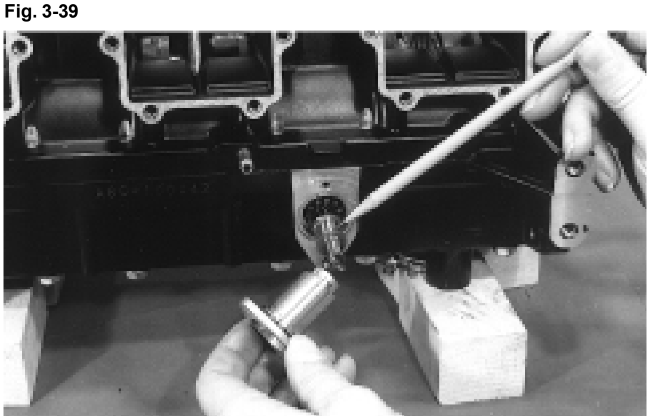
Fig. 3-38



AN261

6. Apply a light coat of grease to the sealing surface of the oil pump driveshaft; then install Oil Seal Installation Tool (p/n 0644-219) at the end of the shaft. Twist the shaft as it is pushed through the oil and water pump seals; then remove the tool. Position the shim on the oil pump end of the shaft.

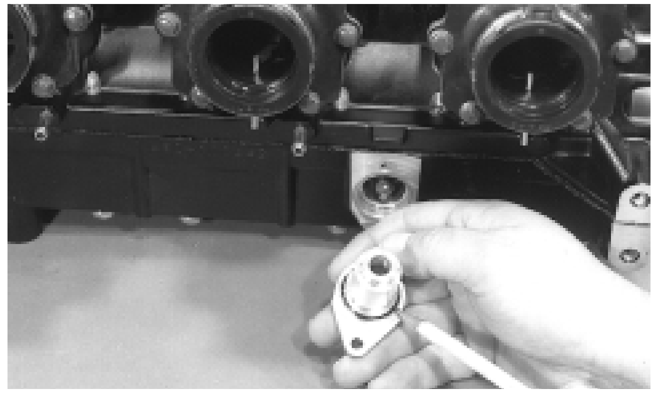
Fig. 3-39



AN231

7. Install the oil-injection pump retainer O-ring and retainer.

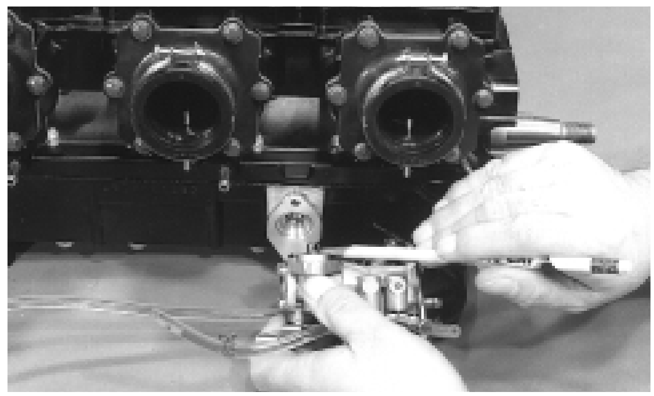
Fig. 3-40



AN184

8. Install the O-ring and the oil-injection pump. Make sure the oil-pump shaft and oil pump align. Secure with two screws and washers. Tighten the two screws securely.

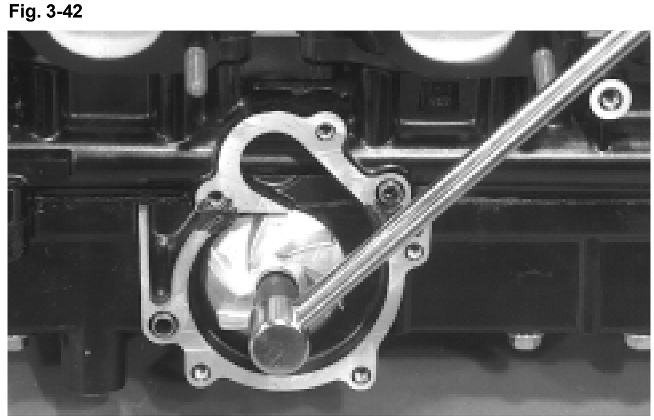
Fig. 3-41



AN183

9. Place the impeller into position and secure with a cap screw and washer. Be sure the rubber side of the washer is directed towards the impeller. Apply blue Loctite #242 to the threads of the cap screw and tighten to 0.8-1.2 kg-m (6-9 ft-lb).

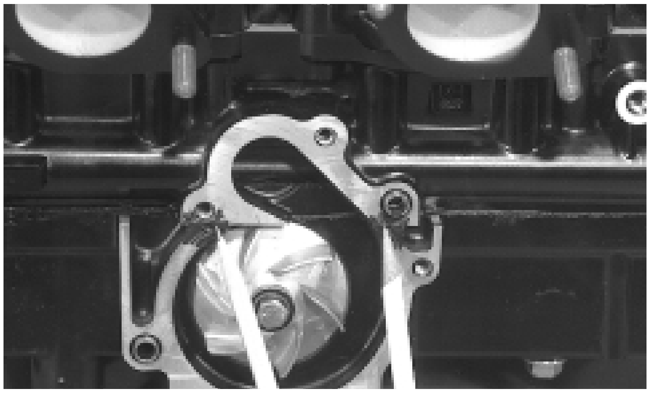
Fig. 3-42



AN178

10. Apply sealant to the crankcase seam; then install the alignment pins into the crankcase if removed.

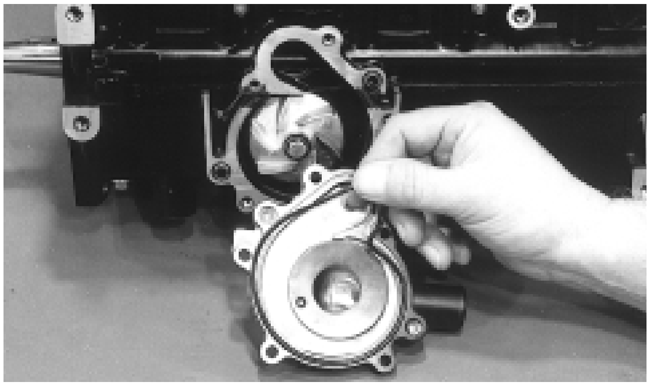
Fig. 3-43



AN179

11. Position the O-ring into the water pump cover; then install the cover. Secure with five screws. Tighten securely.

Fig. 3-44



AN180

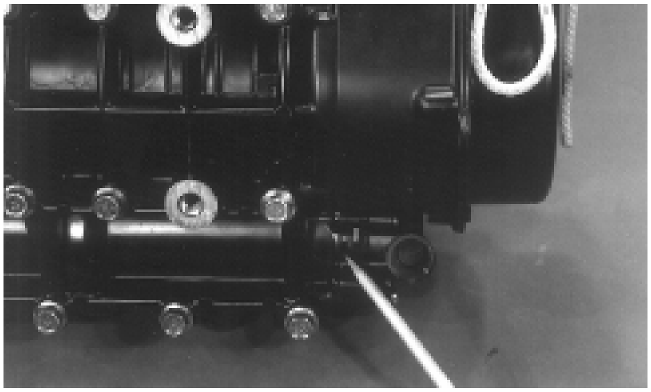
12. Fill the cooling system with antifreeze. Start and run the engine. Check for leaks and recheck the cooling system to make sure it has been properly filled.

Repairing Water Pump (800/1000 cc)

REMOVING AND DISASSEMBLING

■ **NOTE: A bleed hole is located at the bottom of the water pump housing. If there is any sign of coolant leakage from the bleed hole, the water pump seals must be replaced. When servicing the water pump, use Water Pump Bearing and Seal Kit (p/n 0644-084).**

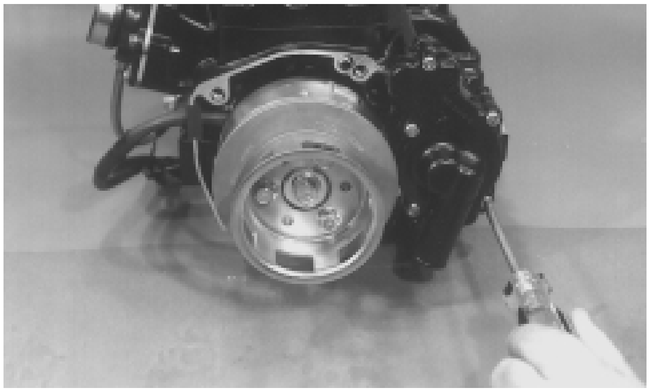
Fig. 3-45



AQ104

1. Remove the recoil starter and magneto housing; then remove the water pump cover.

Fig. 3-46



AQ095

2. Secure the crankshaft using a spanner wrench; then remove the cap screw securing the impeller. Remove the impeller from the shaft.

Fig. 3-47

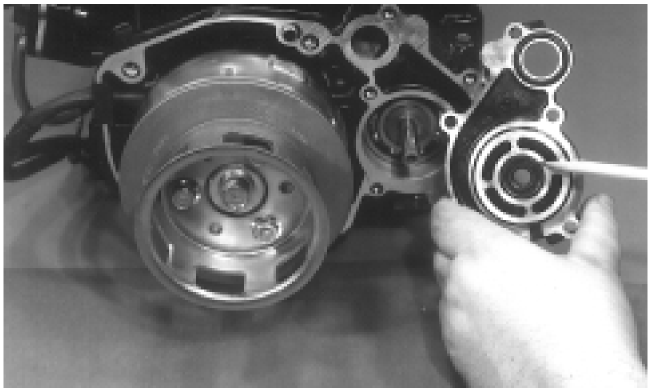


AQ096

3. Slide the center section of the water pump from the shaft. Inspect both the rear and front seals. If either appear in poor condition, replacement is necessary.

3

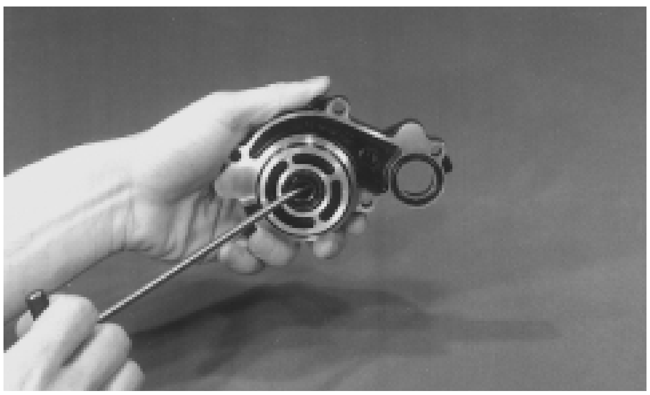
Fig. 3-48



AQ112

4. To remove seals, pull the rear seal from the center section using the puller.

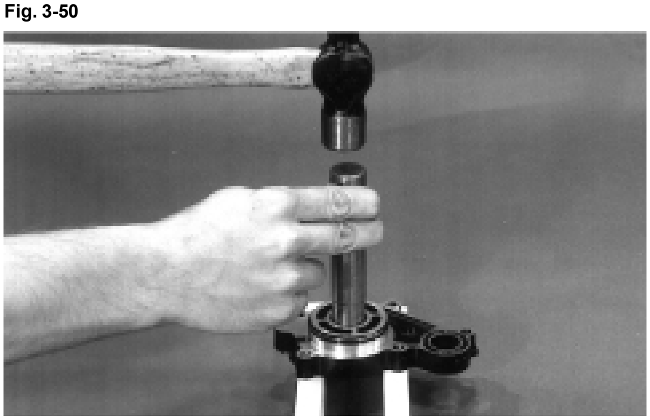
Fig. 3-49



AQ011

5. Using the seal driver, drive the front seal from the center section.

Fig. 3-50

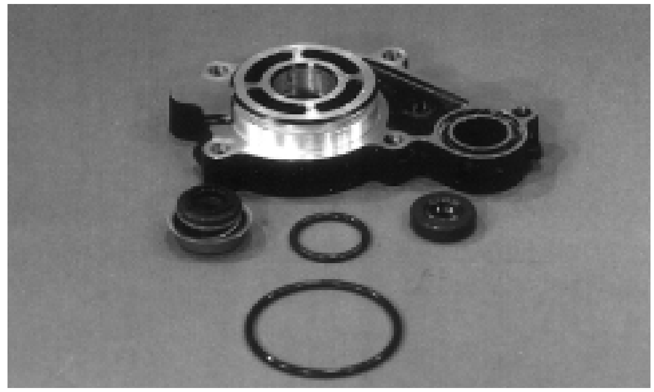


AQ012

ASSEMBLING AND INSTALLING

■ **NOTE: Shown are the seals and O-rings required to rebuild the water pump. Clean the center section seal area and inspect the center section for any signs of wear or scoring in the impeller area.**

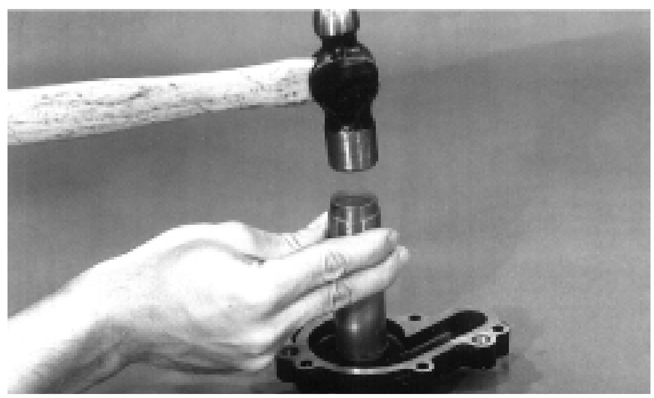
Fig. 3-51



AQ013

1. Using the seal driver, install the front mechanical seal. Drive the seal down into the center section until it is firmly seated against its metal flange.

Fig. 3-52



AQ014

2. Using the driver, install the rear seal. The spring side of the seal must face outward. The seal outer surface must be flush with the case.

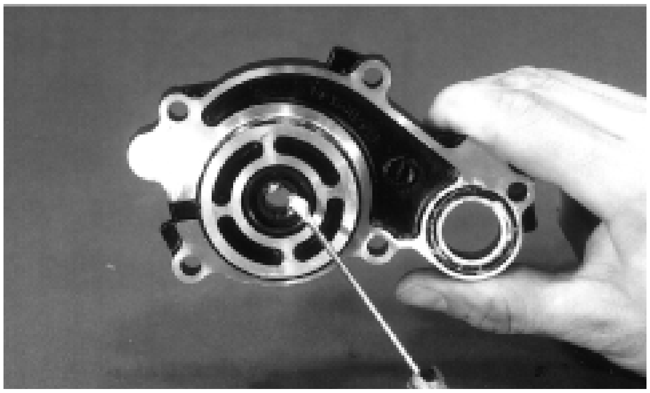
Fig. 3-53



AQ015

3. With the rear seal installed, apply a generous amount of grease to the seal lips; then install the O-rings and coat with grease.

Fig. 3-54



AQ016

4. Install the water pump center section on the crankcase. Install the new impeller sealing ring on the backside of the impeller.

Fig. 3-55



AQ008

5. Install the impeller and secure with a cap screw (coated with blue Loctite #242) and flat washer. The washer has a rubber coated side which must face the impeller. Tighten the cap screw to 0.8-1.2 kg-m (6-9 ft-lb).

6. Install the outer water pump cover and O-ring seal. Secure the cover with five screws.

Fig. 3-56



AQ005

7. Install the magneto housing and recoil starter.

8. Fill the cooling system with antifreeze. Start and run the engine. Check for leaks and recheck the cooling system to make sure it has been properly filled.

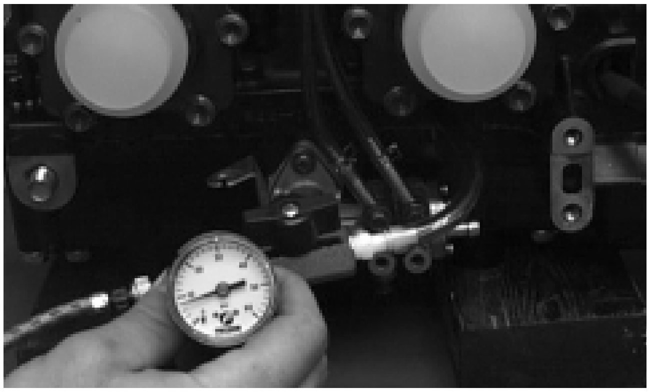
Pressure Testing Engine

1. Test the engine for air leaks using the following procedure and Pressure Testing Kit (p/n 0144-127).
   a. Install a plug into each intake-manifold port and tighten the flange clamps securely.
   b. Place a rubber plug and cover on each exhaust port and secure.
   c. Connect the tester pump to an impulse fitting on the crankcase; then plug any remaining impulse fittings and pressurize the crankcase to 8 psi and close the valve.

⚠ CAUTION

DO NOT exceed 8 psi pressure or damage to the seals will result.

Fig. 3-57



AN128D

   d. Monitor the pressure gauge. The pressure must not drop at a rate of more than 1 psi per minute.
   e. If the pressure drops faster than specified, inspect for an air leak with soapy water or by completely submerging the pressurized engine in clean fresh water. Repair as needed.

⚠ CAUTION

When submerging the engine to test for air leaks, all external electrical components must be removed to avoid damage.

Liquid Cooling System

The liquid cooling system consists of heat exchangers, water pump, and thermostat. The system should be inspected for leaks or damage whenever an overheating problem is experienced.

FILLING COOLING SYSTEM

> ⚠ **CAUTION**
>
> **Be sure the cooling sustem is thoroughly filled using the following procedure.**

1. Elevate the front of the snowmobile 30-60 cm (12-14 in.).

2. Remove the coolant tank cap and check coolant level. The coolant tank should be filled to the coolant level line.

3. Install the coolant tank cap; then start the engine. Run the engine at 3000-3500 RPM until the bottom heat exchangers become hot to the touch. Stop the engine and allow the system to cool.

4. Lower the front of the snowmobile and elevate the rear of the snowmobile 12-14 in. Repeat the procedures in step 3.

5. Check the coolant level. Add coolant as required to the coolant tank (coolant tank should be filled to coolant level line). Repeat procedure until coolant level stabilizes in the coolant tank.

■ **NOTE: If coolant is required, mix coolant for a temperature of -36°C (-34°F). Follow mixing recommendations of the manufacturer of the coolant.**

> ⚠ **CAUTION**
>
> **It is extremely important that the Filling Cooling System procedure is followed very closely and the cooling system is properly filled. If the system isn't properly filled, piston damage will occur.**

INSPECTING COOLANT HOSES AND CLAMPS

All coolant hoses and connections should be checked annually for deterioration, cracks, and wear.

All coolant hoses and clamps should be replaced every four years.

INSPECTING THERMOSTAT

1. Inspect the thermostat for corrosion, wear, or spring damage.

2. Using the following procedure, inspect the thermostat for proper operation.

   a. Suspend the thermostat in a container filled with water.

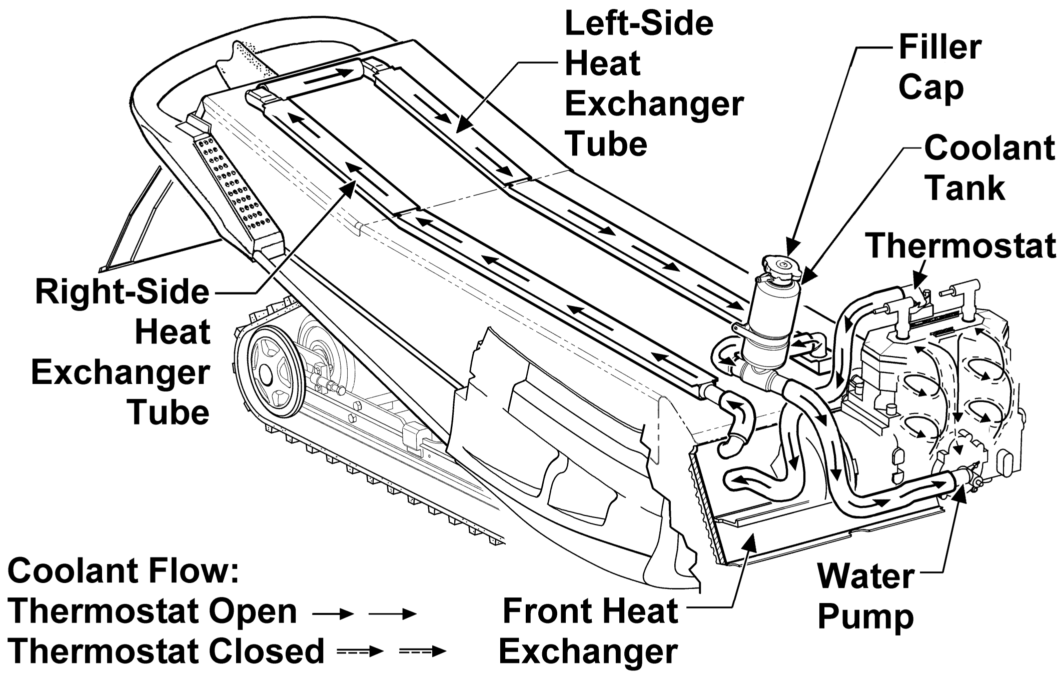
   b. Heat the water and monitor the temperature with a thermometer.

   c. The thermostat should open at 50°C (122°F). Once the thermostat starts to open, IMMEDIATELY remove the thermostat as it will lock in the open position if allowed to open fully.

■ **NOTE: The thermostat is of the lock-open type. If the thermostat is ever allowed to fully open, it will remain open and replacement will be necessary.**

COOLING SYSTEM SCHEMATICS

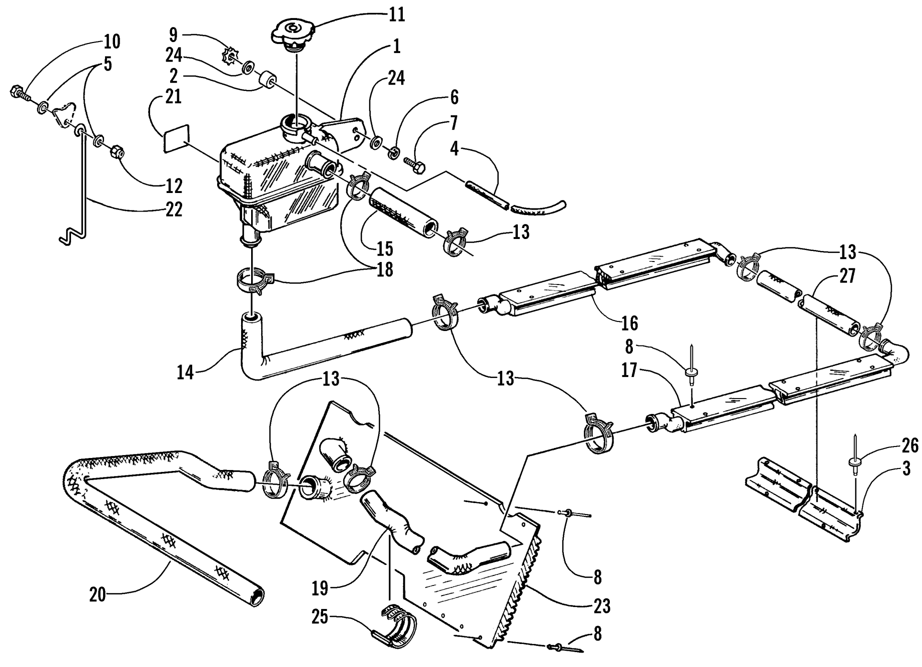
Fig. 3-58



0734-451

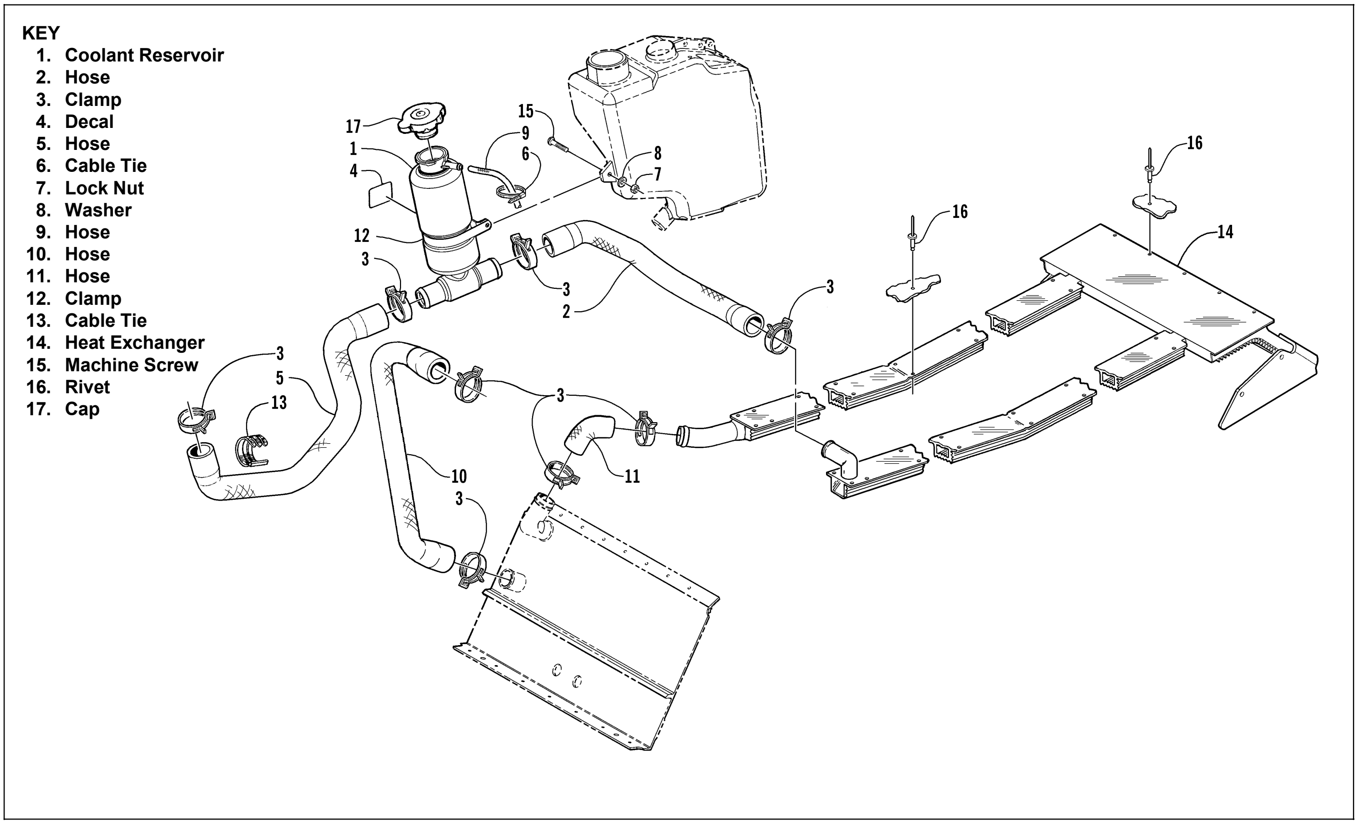
Fig. 3-59

KEY
1. Coolant Reservoir
2. Spacer
3. Guard
4. Vent Hose
5. Washer
6. Lock Washer
7. Cap Screw
8. Rivet
9. Lock Washer
10. Cap Screw
11. Cap
12. Lock Nut
13. Clamp
14. Hose
15. Hose
16. Heat Exchanger
17. Heat Exchanger
18. Clamp
19. Hose
20. Hose
21. Decal
22. Wire Form Bracket
23. Heat Exchanger
24. Washer
25. Cable Tie
26. Rivet
27. Hose



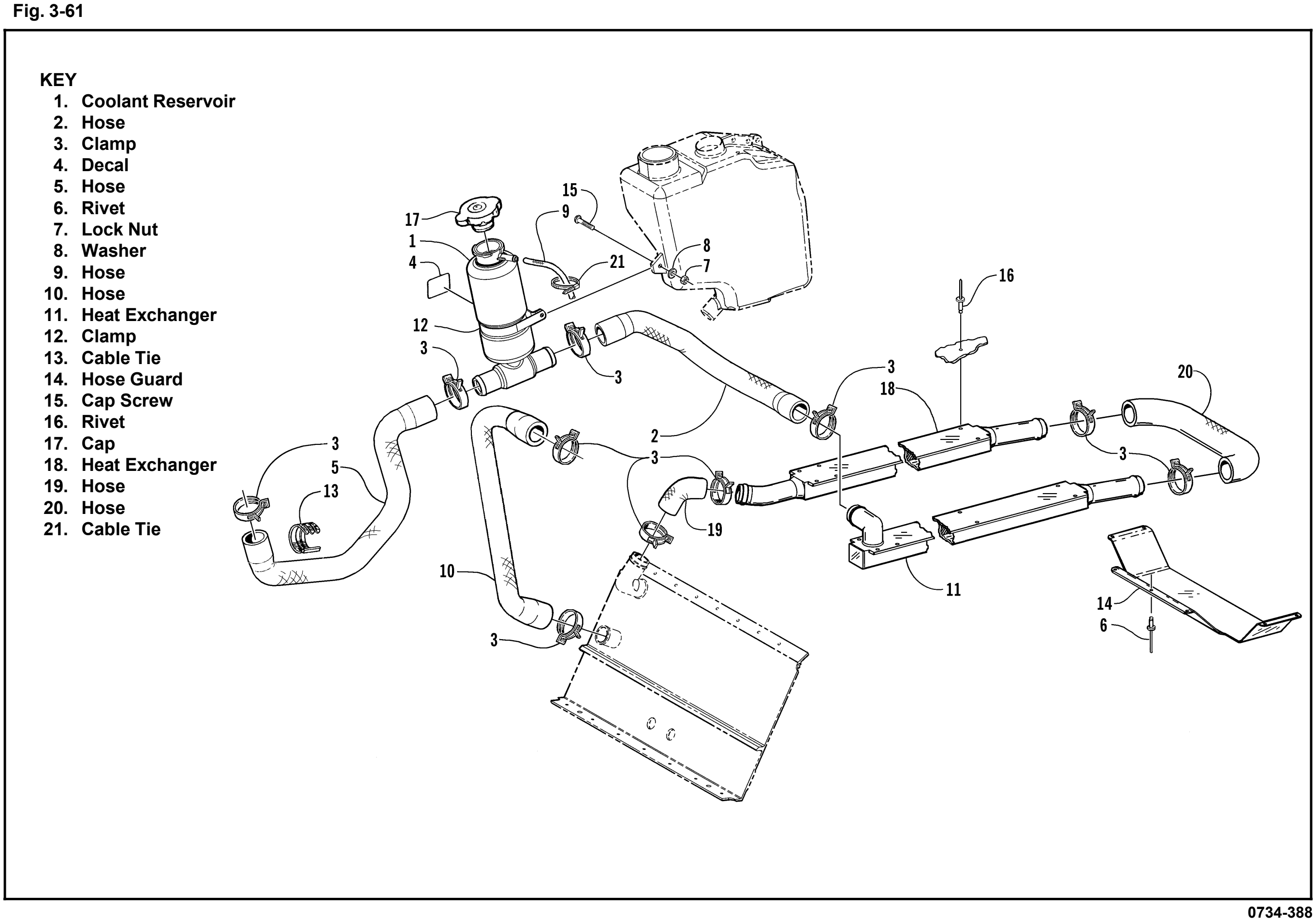
0734-956

Fig. 3-60



0735-278

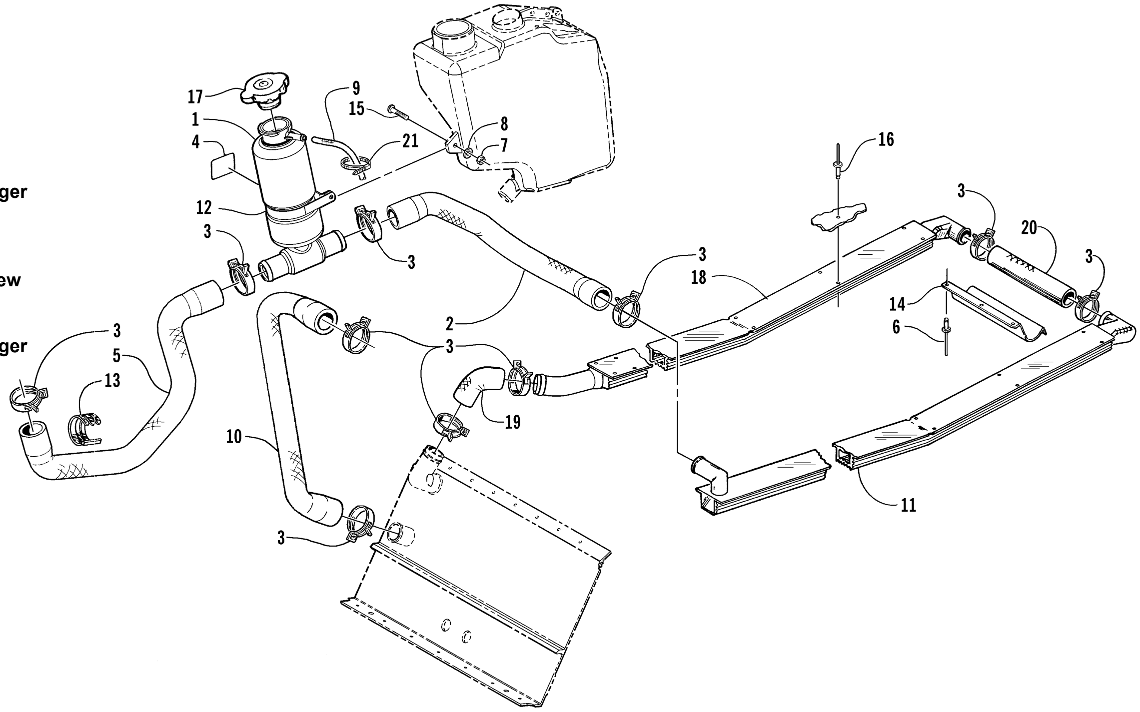
Fig. 3-61



0734-388

Fig. 3-62

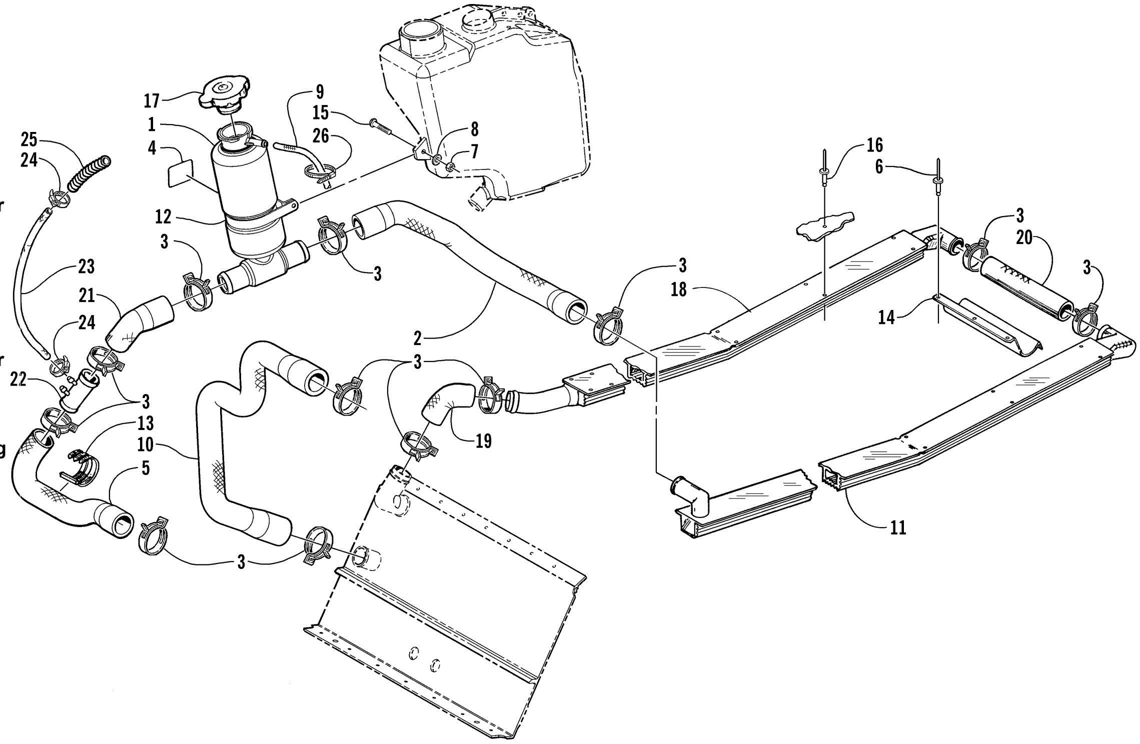
KEY
1. Coolant Reservoir
2. Hose
3. Clamp
4. Decal
5. Hose
6. Rivet
7. Lock Nut
8. Washer
9. Hose
10. Hose
11. Heat Exchanger
12. Clamp
13. Cable Tie
14. Hose Guard
15. Machine Screw
16. Rivet
17. Cap
18. Heat Exchanger
19. Hose
20. Hose
21. Cable Tie



0734-334

Fig. 3-63

KEY
1. Coolant Reservoir
2. Hose
3. Clamp
4. Decal
5. Hose
6. Rivet
7. Lock Nut
8. Washer
9. Hose
10. Hose
11. Heat Exchanger
12. Clamp
13. Cable Tie
14. Guard
15. Machine Screw
16. Rivet
17. Cap
18. Heat Exchanger
19. Hose
20. Hose
21. Hose
22. Double T-Fitting
23. Hose
24. Clamp
25. Conduit
26. Cable Tie



0734-305

Recoil Starter

REMOVING

1. Tie a slip-knot in the starter rope below the console and allow the rope to slowly retract against the starter case.

2. Remove the knot at the handle, remove the handle, and account for the handle cap; then thread the rope through the bushing in the console.

3. Remove the four cap screws and lock washers securing the starter assembly to the magneto case; then remove the starter assembly.

DISASSEMBLING

> ⚠ **WARNING**
>
> **Always wear safety glasses when servicing the recoil starter.**

1. Secure the recoil starter in a vise.

> ⚠ **WARNING**
>
> **During the disassembly procedure, continuous downward pressure must be exerted on the reel so it does not accidentally disengage and cause injury.**

2. Rotate the roller counterclockwise until the notch of the roller is near the rope guide in the case. Guide the rope into the notch and slowly allow the roller to retract until all recoil spring tension is released.

Fig. 3-64

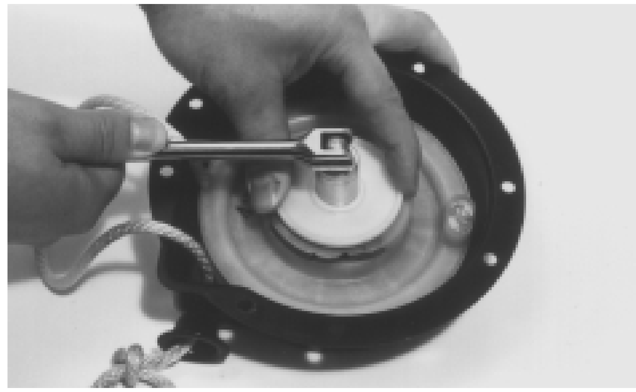


B522

> ⚠ **WARNING**
>
> **Care must be taken when allowing the recoil roller to unwind. Make sure all spring tension is released before continuing.**

3. While exerting downward pressure on the drive plate, remove the nut and washer.

Fig. 3-65

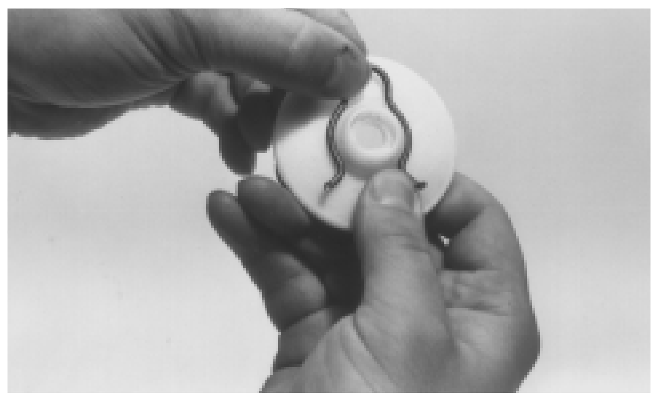


B523

4. Slowly release the drive plate and lift the drive plate with friction spring free of the recoil roller.

5. Remove the friction spring from the drive plate.

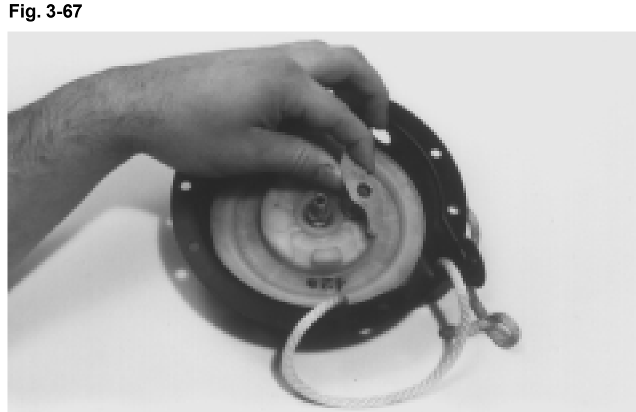
Fig. 3-66



B524

6. Remove the pawl; then remove the return spring.

Fig. 3-67



B525

7. Carefully lift the roller free of the case making sure the main spring does not accidentally disengage from the case.

> ⚠ **WARNING**
>
> **Care must be taken when lifting the roller free of the case.**

8. Remove the main spring from the case by lifting the spring end up and out. Hold the remainder of the spring with thumbs and alternately release each thumb to allow the spring to gradually release from the case.

■ **NOTE: Do not remove the main spring unless replacement is necessary. It should be visually inspected in place to save time.**

9. Unwind the rope from the roller, untie the slip-knot, and remove the rope.

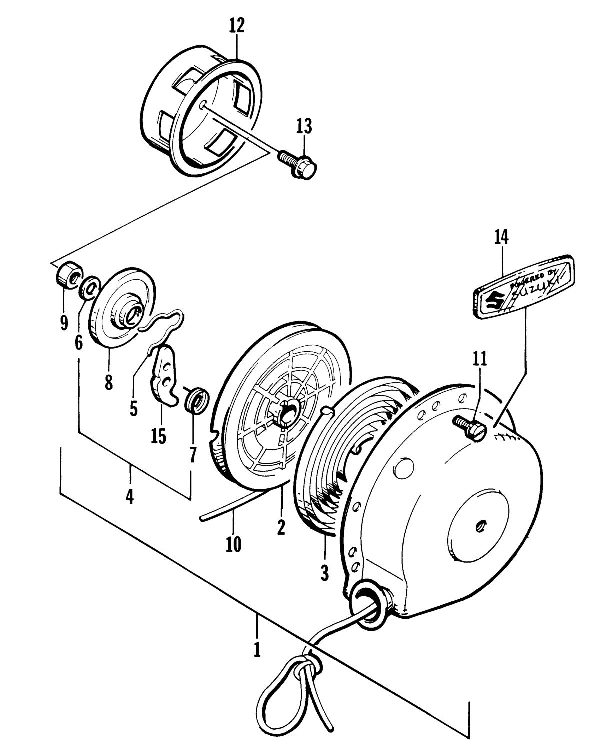
CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all recoil starter components.
2. Inspect all springs, washers, and pawl for wear or damage.
3. Inspect the roller and case for cracks or damage.
4. Inspect the center hub for wear, cracks, or damage.
5. Inspect the rope for breaks or fraying.
6. Inspect the main spring for cracks, crystallization, or abnormal bends.
7. Inspect the handle for damage, cracks, or deterioration.

ASSEMBLING

Fig. 3-68



KEY

1. Starter Assy	9. Nut
2. Starter Roller	10. Starter Rope
3. Main Spring	11. Cap Screw
4. Ratchet Set	12. Starter Pulley
5. Friction Spring	13. Bolt
6. Washer	14. Decal
7. Return Spring	15. Pawl
8. Drive Plate	

732-515A

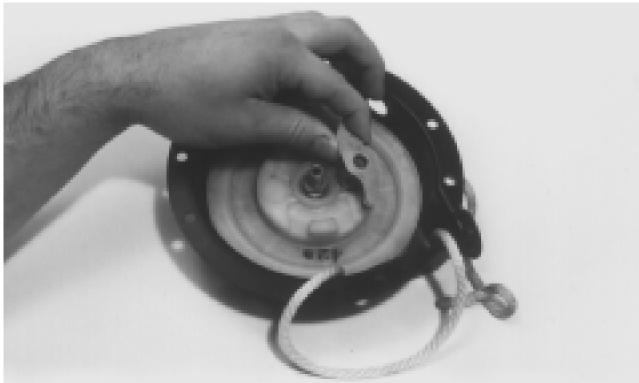
1. Hook the end of the main spring around the mounting lug in the case.
2. Insert the main spring into the case; then wind it in a counterclockwise direction until the complete spring is installed.

■ **NOTE: The main spring must seat evenly in the recoil case.**

3. Insert the rope through the hole in the roller and tie a knot in the end; then wrap the rope counterclockwise around the roller leaving approximately 50 cm (20 in.) of rope free of the roller.
4. Apply low-temperature grease to the main spring and hub.
5. Align the hook in the end of the main spring with the notch in the roller.
6. Carefully slide the roller over the hub and engage the spring with the roller.

7. Install the return spring making sure the end is properly installed in the hole in the roller; then install the pawl making sure the return spring is properly preloaded.

Fig. 3-69

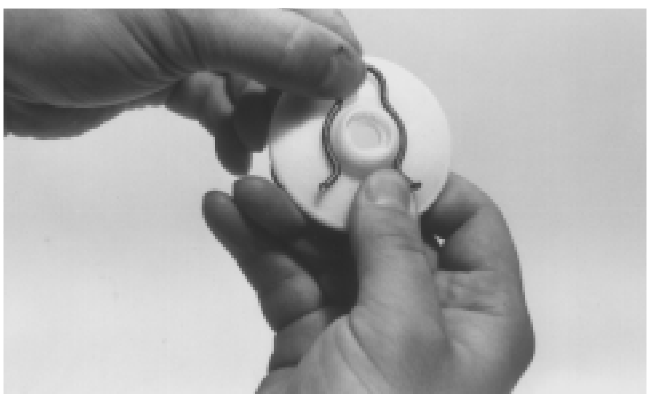


B525

8. Slide the end of the rope through the rope guide of the case; then tie a slip-knot in the rope.

9. Place the friction spring into position on the drive plate making sure the head of the spring is opposite the flat of the inner hole. Apply a low-temperature grease to the drive plate.

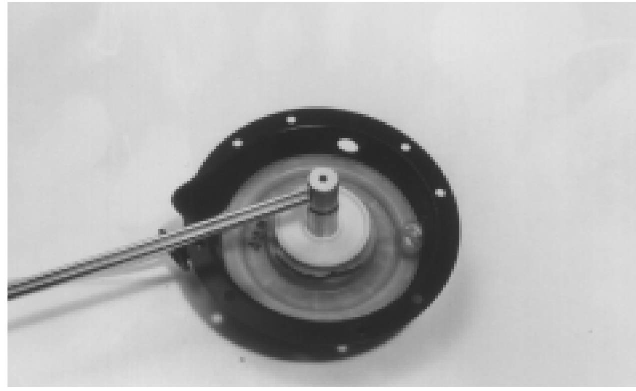
Fig. 3-70



B524

10. Place the drive plate into position making sure the flat of the inner hole is correctly positioned in the hub. Apply blue Loctite #242 to the threads; then secure the drive plate with a washer and nut. Tighten to 1 kg-m (7 ft-lb).

Fig. 3-71



B526

11. With 50 cm (20 in.) of rope exposed, hook the rope in the notch of the roller.

12. Rotate the roller four or five turns counterclockwise; then release the rope from the notch and allow the rope to retract.

13. Pull the rope out two or three times to check for correct tension.

■ **NOTE: Increasing the rotations in step 12 will increase spring tension.**

INSTALLING

1. Place the starter assembly into position against the magneto case.

2. Secure the starter with four cap screws and lock washers. Tighten to 0.7 kg-m (5 ft-lb).

■ **NOTE: Before tightening the cap screws, slowly pull the recoil rope until the pawl engages; then tighten the cap screws. This will center the recoil against the magneto case.**

3. Thread the rope through the bushing in the console; then install the handle and secure with a knot. Seat the cap.

4. Release the slip-knot in the rope.

SECTION 4 — FUEL SYSTEMS

4

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Fuel System (Related Items) 4-66

Fuel System
(Carbureted)

Whenever any maintenance or inspection is made on the fuel system in which fuel leakage may occur, there should be no welding, smoking, or open flames in the area.

■ **NOTE: Some photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.**

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Pre-Maintenance Checks

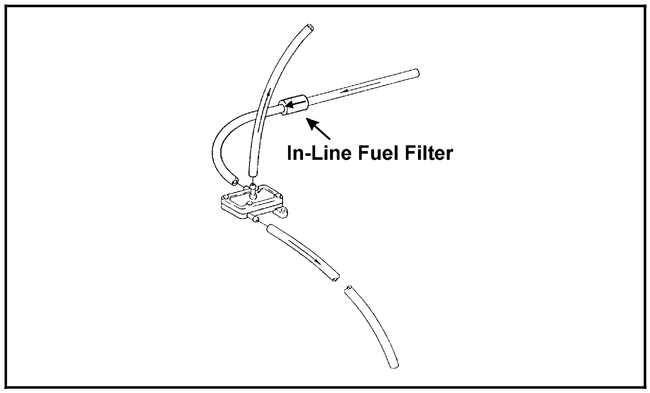
Before troubleshooting the fuel system, several simple checks should be performed. Many times what appears to be a serious problem is only a minor one.

1. Make sure the fuel shut-off valve was in the OPEN position.
2. Turn the fuel shut-off valve to the CLOSED position; then remove the in-line fuel filter. If the filter is dirty, replace the filter.

■ **NOTE: Determine which style in-line fuel filter is being replaced and remove and install accordingly.**

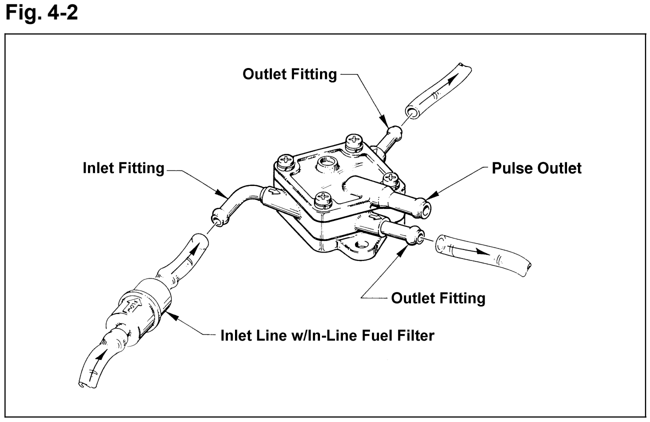
3. Install a new filter making sure the arrow on the filter is directed toward the fuel pump.

Fig. 4-1



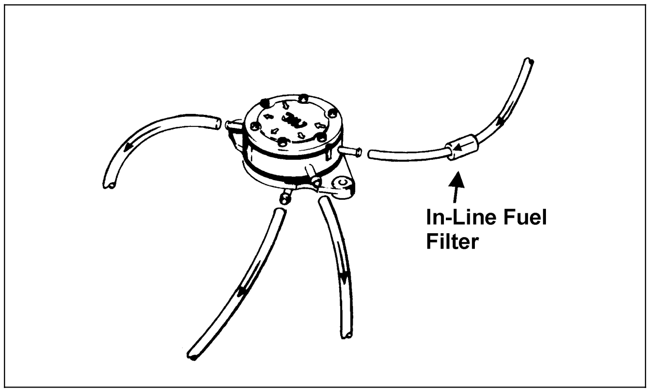
726-065A

Fig. 4-2



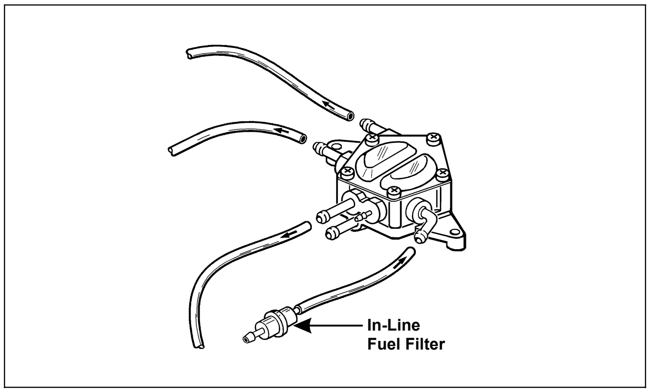
728-272A

Fig. 4-3



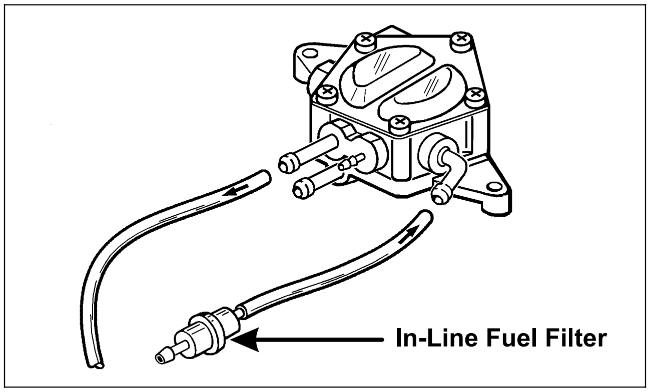
725-067A

Fig. 4-4



734-292A

Fig. 4-5



734-292B

4. Check the hoses to ensure that all are correctly connected; then check for cracks. If any cracks are evident in the hoses, replace them making sure none are against any hot or moving parts. Hoses must fit tightly. If hoses do not fit tightly, cut 6 mm (1/4 in.) from the end and install.

5. Check the impulse hose for cracks or any possible air leaks. The hose must fit tightly at both ends. If loose or cracked, replace the hose.

6. Check each carburetor vent hose for kinks or obstructions; remove any obstructions.

7. Check each carburetor float chamber drain hose for water or debris. If seen, clean by removing the plug and draining the drain hose into a small container.

8. Check the gas tank vent hose and fuel hose for obstructions; remove any obstructions.

9. Turn the fuel shut-off valve to the OPEN position.

Changing Main Jet(s)
(VM-Style)

The carburetor main jet(s) must be changed in conjunction with the changes in temperature, altitude, and type of gasoline being used.

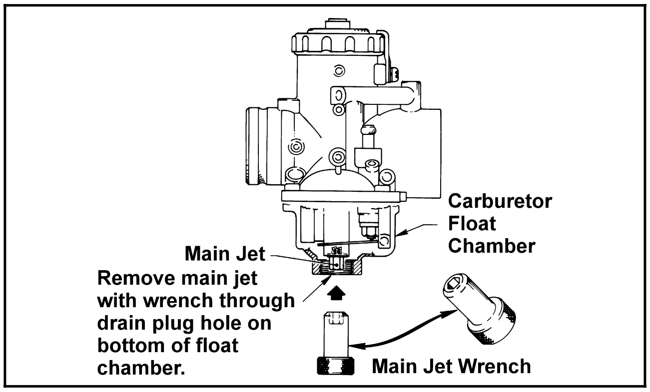
1. Loosen each carburetor flange clamp and remove each carburetor from the intake flange and boot.

2. Remove the drain plug and O-ring from each carburetor float chamber and drain the gas into either a small container or an absorbent towel.

3. Using the Main Jet Wrench (p/n 0644-065), thread the main jet out of each carburetor. Account for the baffle ring. Install the new main jet with baffle ring and tighten securely.

4. Install the drain plug and O-ring; then tighten securely.

Fig. 4-6



0728-054

5. Install and secure each carburetor.

4

Changing Main Jets
(TM-Style)

The carburetor main jets must be changed in conjunction with the changes in temperature, altitude, and type of gasoline being used.

1. Remove the machine screw and washer securing the mounting plate (for the ignition coil and fuel pump) to the air-intake silencer.

Fig. 4-7



AN613D

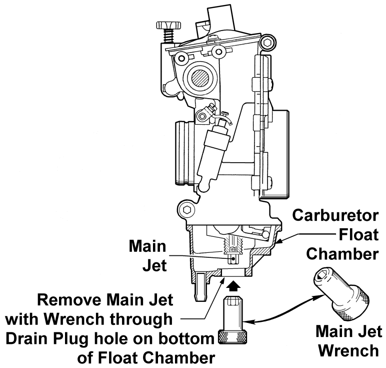
2. Remove the screws securing the air-intake silencer; then move the silencer forward and out of the engine compartment.

3. Loosen the carburetor flange clamps and slide the carburetors out of the intake flanges. Tilt the carburetors forward to access the main jets.

4. Remove the drain plug (with O-ring) from each carburetor float chamber and drain the gas into either a small container or an absorbent towel.

5. Using the Main Jet Wrench (p/n 0644-065), thread the main jet out of each carburetor. Account for the washer. Install the new main jet and washer and tighten securely.

Fig. 4-8



0734-280

6. Install the drain plug with O-ring; then tighten securely.

7. Push the carburetors back into position and into the intake flanges; then tighten the flange clamps.

8. Place the air-intake silencer into position in the engine compartment making sure the carburetors are properly positioned in the boot and secure with the screws.

■ **NOTE: Make sure the pilot air jet hoses are properly positioned in the air-intake silencer.**

9. Place the ignition coil/fuel pump mounting plate into position on the air-intake silencer and secure with the machine screw and washer.

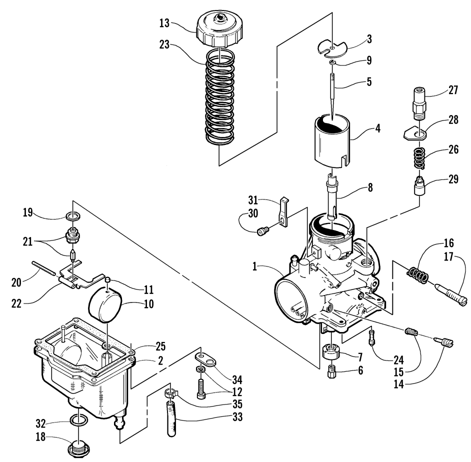
Carburetor Schematics

Fig. 4-9

VM-32

KEY

1. Mixing Body Assy
2. Float Chamber
3. Plate
4. Piston Valve
5. Jet Needle
6. Main Jet
7. Baffle Ring
8. Needle Jet
9. E-Clip
10. Float
11. Cap
12. Screw w/Spring Washer
13. Mixing Body Top
14. Pilot Air Screw
15. Spring
16. Spring
17. Idle Speed Screw
18. Drain Screw
19. Washer
20. Float Pin
21. Needle Valve Assy
22. Float Arm
23. Piston Valve Spring
24. Pilot Jet
25. Gasket
26. Starter Plunger Spring
27. Starter Plunger Cap
28. Washer
29. Starter Plunger
30. Screw w/Spring Washer
31. Plate
32. O-Ring
33. Drain Hose
34. Plate
35. Clamp



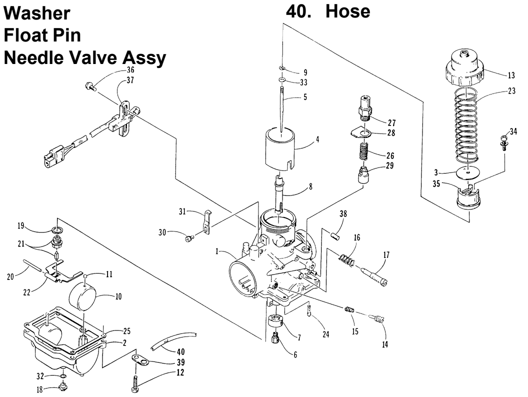
0734-559

Fig. 4-10

VM-34

KEY

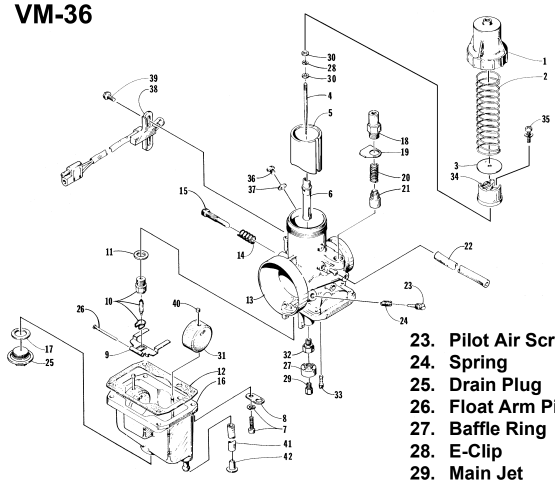
1. Mixing Body Assy
2. Float Chamber
3. Plate
4. Piston Valve
5. Jet Needle
6. Main Jet
7. Baffle Ring
8. Needle Jet
9. E-Clip
10. Float
11. Cap
12. Screw w/Spring Washer
13. Mixing Body Top
14. Pilot Air Screw
15. Spring
16. Spring
17. Idle Speed Screw
18. Drain Screw
19. Washer
20. Float Pin
21. Needle Valve Assy
22. Float Arm
23. Piston Valve Spring
24. Pilot Jet
25. Gasket
26. Starter Plunger Spring
27. Starter Plunger Cap
28. Washer
29. Starter Plunger
30. Screw w/Spring Washer
31. Plate
32. O-Ring
33. Washer
34. Screw w/Washer
35. Magnet
36. Self-Tapping Screw
37. Magnetic Switch
38. Cap
39. Plate
40. Hose



0728-769

Fig. 4-11

VM-36



KEY

1. Mixing Body Top
2. Piston Valve Spring
3. Plate
4. Jet Needle
5. Piston Valve
6. Needle Jet
7. Screw w/Spring Washer
8. Plate
9. Float Arm
10. Needle Valve Assy
11. Washer
12. Gasket
13. Mixing Body Assy
14. Spring
15. Idle Speed Screw
16. Float Chamber
17. Packing
18. Starter Plunger Cap
19. Washer
20. Spring
21. Plunger
22. Tube
23. Pilot Air Screw
24. Spring
25. Drain Plug
26. Float Arm Pin
27. Baffle Ring
28. E-Clip
29. Main Jet
30. E-Clip Washer
31. Float
32. Screw Guide
33. Pilot Jet
34. Magnet Block
35. Machine Screw
36. Machine Screw
37. Washer
38. Magnetic Switch
39. Cap Screw
40. Cap
41. Hose
42. Drain Plug

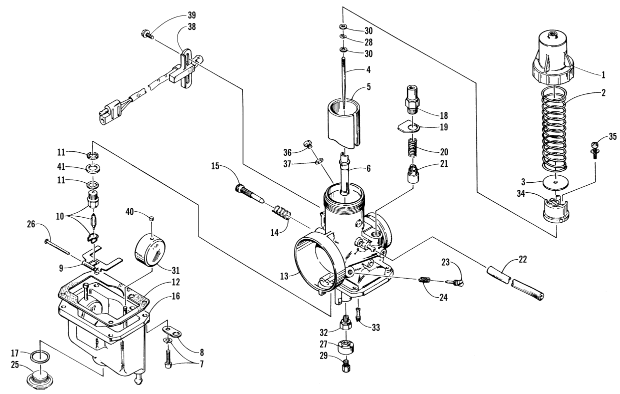
0733-907

Fig. 4-12

VM-38

KEY

1. Mixing Body Top
2. Piston Valve Spring
3. Plate
4. Jet Needle
5. Piston Valve
6. Needle Jet
7. Screw w/Spring Washer
8. Plate
9. Float Arm
10. Needle Valve Assy
11. Washer
12. Gasket
13. Mixing Body Assy
14. Spring
15. Idle Speed Screw
16. Float Chamber
17. Washer
18. Starter Plunger Cap
19. Washer
20. Spring
21. Plunger
22. Air Vent Tube
23. Pilot Air Screw
24. Spring
25. Drain Plug
26. Float Arm Pin
27. Baffle Ring
28. E-Clip
29. Main Jet
30. E-Clip Washer
31. Float
32. Screw Guide
33. Pilot Jet
34. Magnet Block
35. Screw w/Washer
36. Cap Screw
37. Washer
38. Magnetic Switch
39. Cap Screw
40. Cap
41. Washer



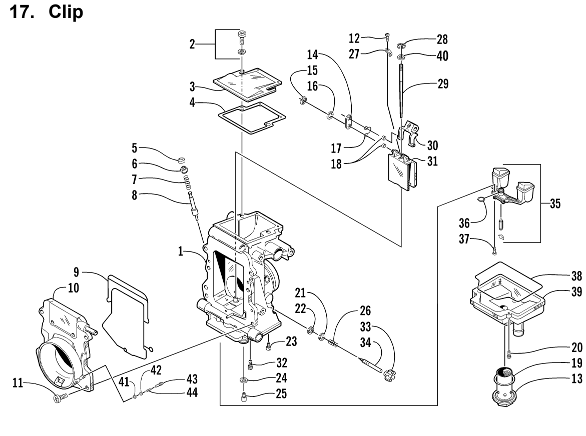
0733-676

Fig. 4-13

TM-38 (Triple)

KEY

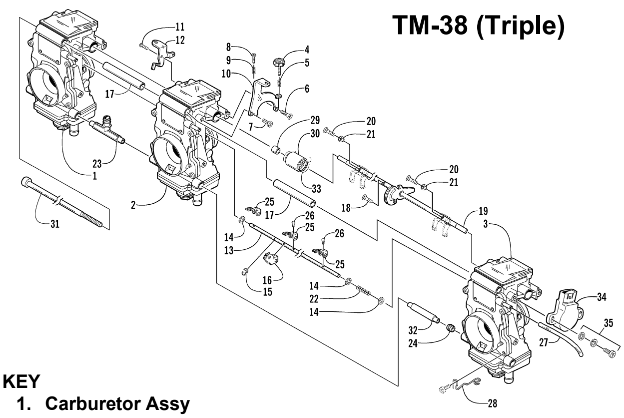
1. Mixing Body
2. Screw w/Washer
3. Top Cap
4. Gasket
5. Plunger Cap
6. Guide
7. Spring
8. Starter Plunger
9. Gasket
10. Funnel Assy
11. Screw
12. Screw
13. Plug
14. Plate
15. E-Clip
16. Washer
17. Clip
18. Bushing
19. O-Ring
20. Screw
21. Washer
22. Washer
23. Starter Jet
24. Washer
25. Main Jet
26. Spring
27. Plate
28. E-clip
29. Jet Needle
30. Lever Assy
31. Throttle Valve
32. Pilot Jet
33. Cap
34. Fuel Mixture Screw
35. Float Assy
36. O-Ring
37. Screw
38. O-Ring
39. Float Chamber
40. Washer
41. O-Ring
42. Washer
43. Adjuster
44. Spring



0735-335

4

Fig. 4-14



KEY

1. Carburetor Assy
2. Carburetor Assy
3. Carburetor Assy
4. Idle Speed Screw
5. Spring
6. Screw
7. Screw
8. Screw
9. Spring
10. Bracket
11. Screw
12. Bracket
13. Shaft
14. Washers
15. E-Clip
16. Lever
17. Spacer
18. Screw
19. Throttle Lever Shaft Assy
20. Lever Ring Screw
21. Synchronizing Nut
22. Spring
23. Inlet T-Fitting
24. Seal
25. Lever
26. Machine Screw
27. Hose
28. Clip
29. Spacer
30. Sleeve
31. Bolt
32. Spacer
33. Spring
34. Sensor Assy
35. Screw

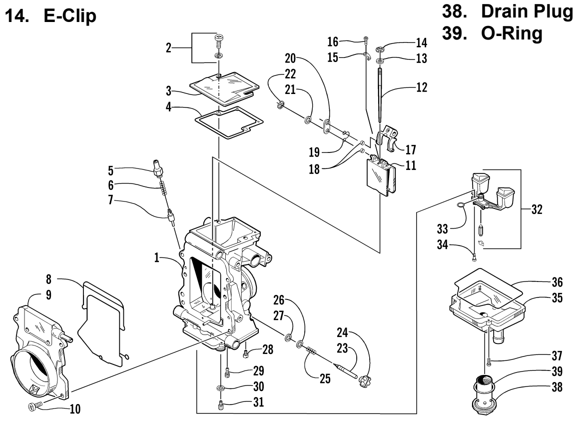
0735-336

Fig. 4-15

TM-38/TM 40 (Twin)

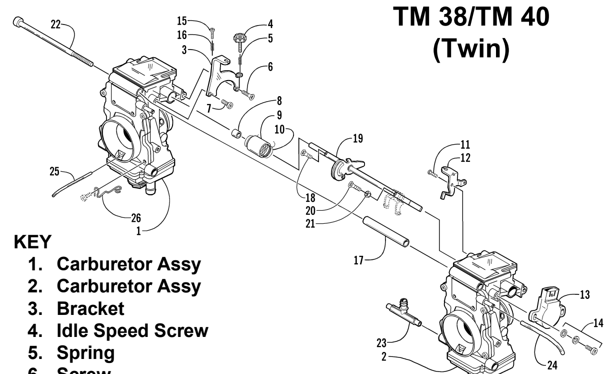
KEY

1. Mixing Body
2. Screw w/Washer
3. Top Cap
4. Gasket
5. Plunger Cap
6. Spring
7. Starter Plunger
8. Gasket
9. Funnel Assy
10. Screw
11. Throttle Valve
12. Jet Needle
13. Washer
14. E-Clip
15. Retaining Plate
16. Retaining Plate Screw
17. Lever Assy
18. Bushing
19. Clip
20. Plate
21. Washer
22. E-Clip
23. Fuel Mixture Screw
24. Cap
25. Spring
26. Washer
27. Rubber Washer
28. Starter Jet
29. Pilot Jet
30. Washer
31. Main Jet
32. Float Assy
33. O-Ring
34. Screw
35. Float Chamber
36. O-Ring
37. Screw
38. Drain Plug
39. O-Ring



0734-158

Fig. 4-16



KEY

1. Carburetor Assy
2. Carburetor Assy
3. Bracket
4. Idle Speed Screw
5. Spring
6. Screw
7. Screw
8. Spacer
9. Sleeve
10. Spring
11. Screw
12. Bracket
13. Sensor Assy
14. Screw w/Washers
15. Screw
16. Spring
17. Spacer
18. Screw
19. Throttle Lever Shaft Assy
20. Lever Ring Screw
21. Synchronizing Nut
22. Bolt
23. T-Fitting
24. Hose
25. Hose
26. Clip

0734-586

Removing Carburetor
(VM-Style)

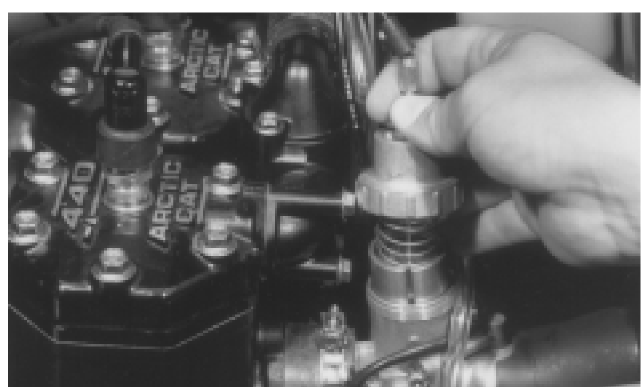
■ **NOTE: On twin and triple carburetor models, remove the carburetors using this basic procedure.**

1. Turn the fuel shut-off valve to the CLOSED position.

2. Loosen the screw and lock plate securing the mixing body top.

3. Remove the mixing body top by rotating it counterclockwise; then remove the top with spring, plate, jet needle with E-clip, and piston valve from the carburetor.

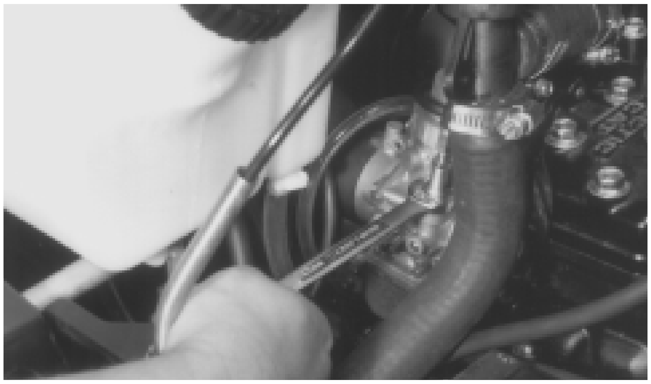
Fig. 4-17



AH100

4. Remove the brass choke-cable housing from the carburetor. Account for a washer.

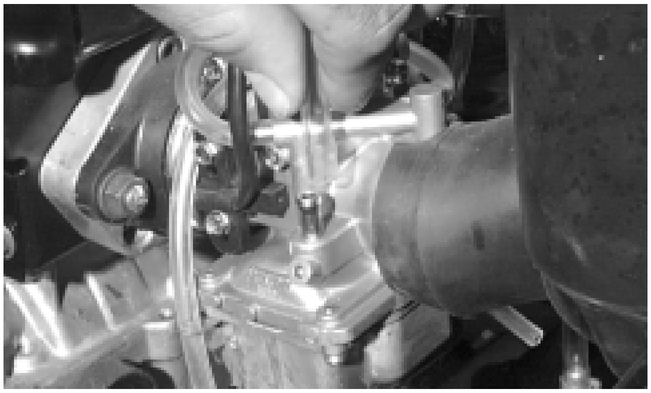
Fig. 4-18



AH099

5. Disconnect the fuel hose from the carburetor inlet fitting.

Fig. 4-19

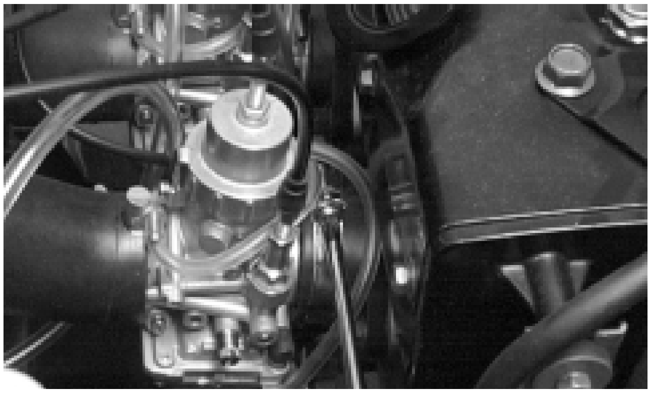


AH284D

6. If applicable, disconnect the safety switch wiring harness connector from the main wiring harness.

7. Loosen the carburetor-flange clamp; then remove the carburetor.

Fig. 4-20



AH283D

■ **NOTE: Slide the carburetor into the air-intake silencer boot until free of the flange; then remove carburetor.**

⚠ CAUTION

Keep MAG-side, center (if applicable), and PTO-side carburetors identified for installation purposes.

Removing Carburetors
(TM-Style)

1. Remove the machine screw and washer securing the mounting plate (for the ignition coil and fuel pump) to the air-intake silencer.

Fig. 4-21



AN613D

2. Remove the screws securing the air-intake silencer; then move the silencer forward and out of the engine compartment.

3. Disconnect the throttle cable and choke cable.

4. Remove the fuel supply hose from the fuel inlet T-fitting.

5. Loosen the carburetor flange clamps; then slide the carburetors out of the flanges and out of the engine compartment.

6. Remove the air jet and float chamber vent hoses.

4

Disassembling Carburetor (VM-Style)

■ **NOTE: On twin and triple carburetor models unless there is a problem with the safety switches, do not loosen or remove the screws securing the switch to the carburetor.**

1. Remove the four screws and lock washers securing the float chamber; then remove the float chamber and gasket.

Fig. 4-22



AH144

■ **NOTE: The floats should be removed only if replacement is necessary or the float chamber requires cleaning with carburetor cleaner.**

2. Remove the caps from the float towers; then remove the floats. Remove the drain plug and O-ring.

Fig. 4-23



B344

3. Remove the float arm pin; then remove the float arm.

⚠ CAUTION

Use care when removing the float arm pin or the towers may break. Also, the pin must be removed from its flattened side.

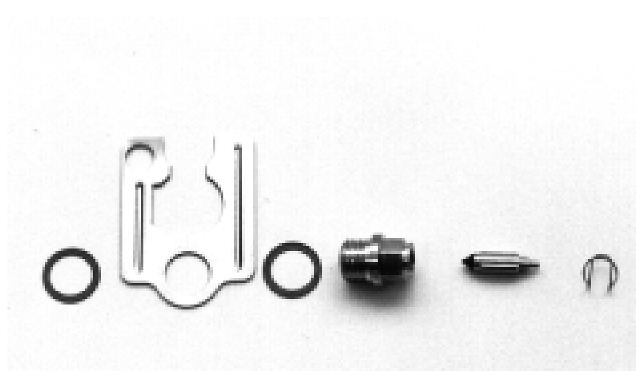
Fig. 4-24



AH138

4. Remove the needle valve retainer; then remove the needle valve. Remove the seat and account for two washers and a plate.

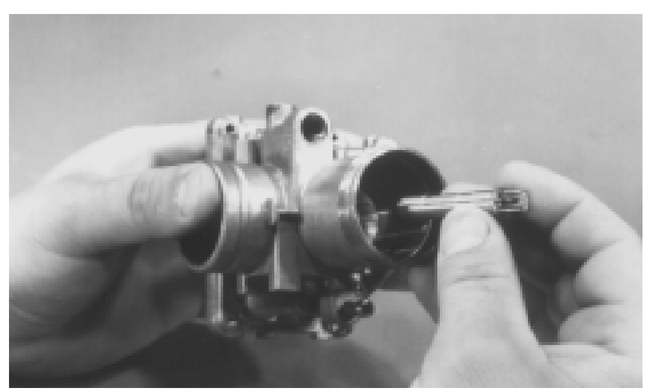
Fig. 4-25



B347

5. Remove the main jet and baffle ring; then remove the main jet extender guide from the needle jet. Push the needle jet out through the top of the carburetor.

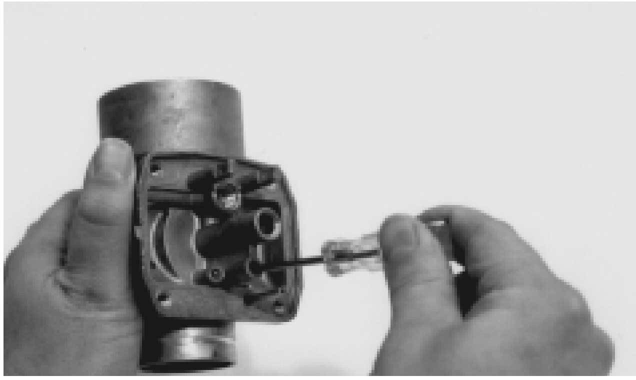
Fig. 4-26



AH084

6. Remove the pilot jet.

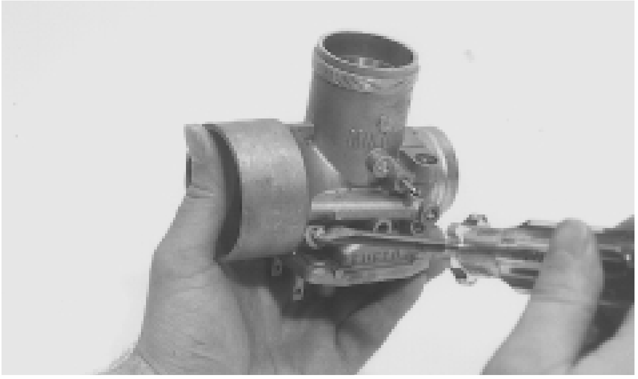
Fig. 4-27



B352

7. While counting the rotations for installing purposes, rotate the pilot air screw clockwise until lightly seated; then remove the pilot air screw and spring.

Fig. 4-28



B350

8. Remove the idle speed screw and spring.

Fig. 4-29



B351

9. Remove the throttle cable from the piston valve; then remove the valve.

Fig. 4-30

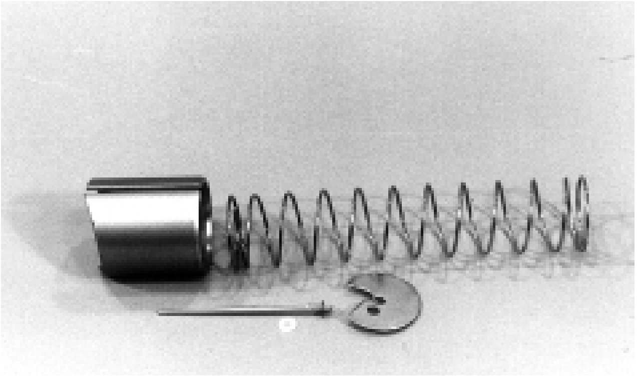


AH074

10. Remove the Phillips-head screw securing the throttle cable retainer to the piston valve; then remove the retainer. Account for the jet needle with E-clip and two washers.

■ **NOTE: Note the position of the E-clip on the jet needle for assembly purposes.**

Fig. 4-31



AH042

⚠ CAUTION

If an engine problem has been experienced due to improper gas/air mixture, verify the carburetor jetting and E-clip position with the Specification Chart and Main Jet Chart on the snowmobile for altitude, temperature, and type of gasoline.

11. Separate the starter plunger assembly from the choke cable by compressing the spring and removing the plunger from the cable; then remove the spring. Thread the plunger cap off the cable.

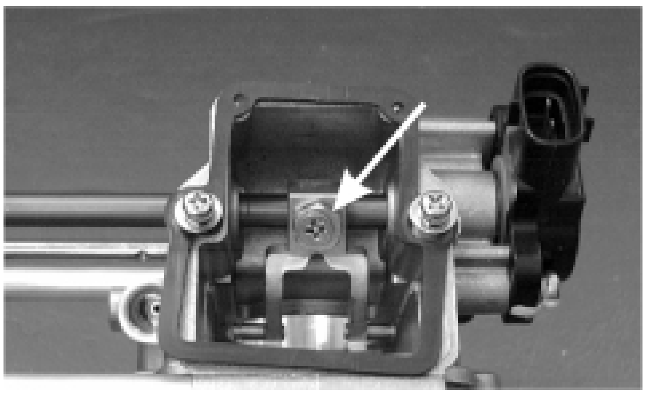
4

Disassembling Carburetors (TM-Style)

⚠ CAUTION

Do not loosen the lever assembly from the throttle lever shaft. If the lever assembly is loosened, the carburetors must be synchronized.

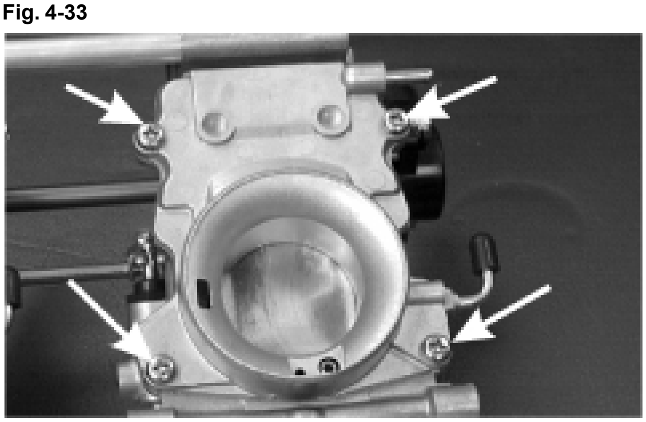
Fig. 4-32



AH631DA

■ **NOTE: The carburetors do not have to be removed to change jet needles or main jets; however, changing throttle valves requires removing the funnel assemblies. The clearance between the throttle valve, mixing body, and funnel assembly (approximately 0.50 mm or 0.020 in.) is normal and should not be a concern.**

Fig. 4-33

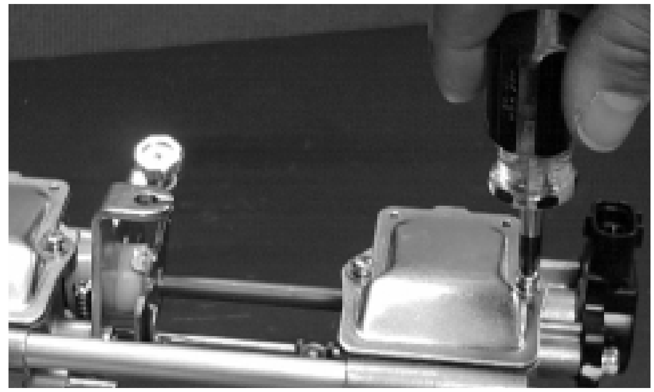


AH622D

■ **NOTE: Disassemble the carburetors using this basic procedure.**

1. Loosen the screws (with washers) securing the top cap to the mixing body; then slide the cap off the body. Account for the gasket.

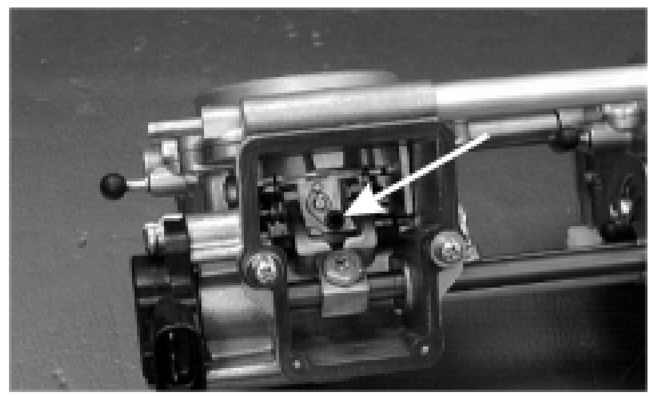
Fig. 4-34



AH615D

2. Loosen the screw securing the jet needle retaining plate; then slide the plate out of the way.

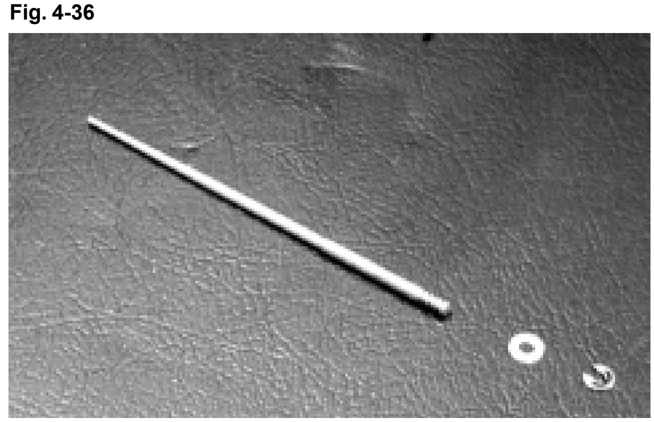
Fig. 4-35



AH616DA

3. Using a pair of needle-nose pliers, remove the jet needle assembly. Account for the E-clip and washer.

Fig. 4-36



AH617D

4. Remove the Phillips-head screw and the drain plug (with O-ring) securing the float chamber to the mixing body. Remove the chamber and account for the O-ring.

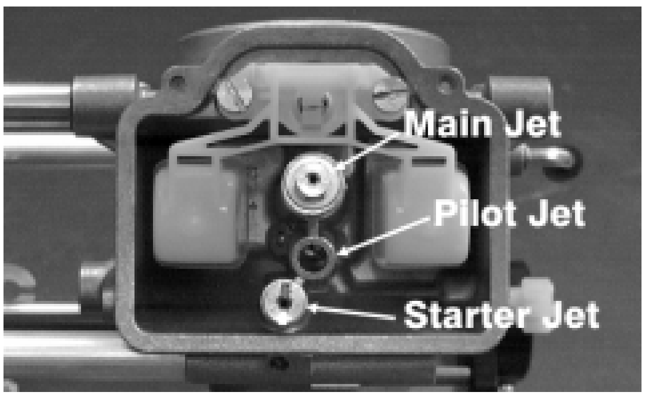
Fig. 4-37



AH618D

5. Remove the main jet (with washer), pilot jet, and starter jet.

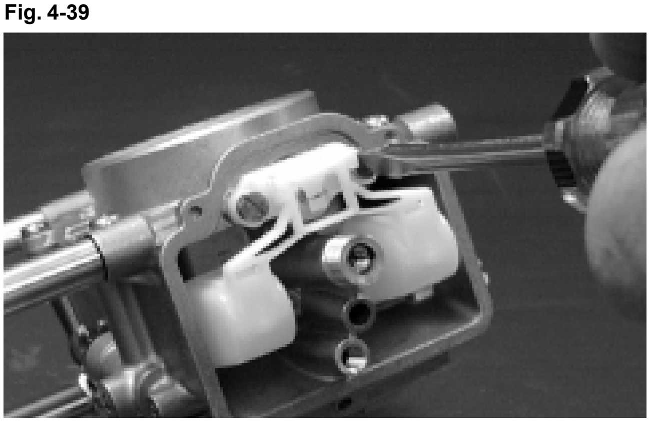
Fig. 4-38



AH619DA

6. Remove the screws securing the float assembly.

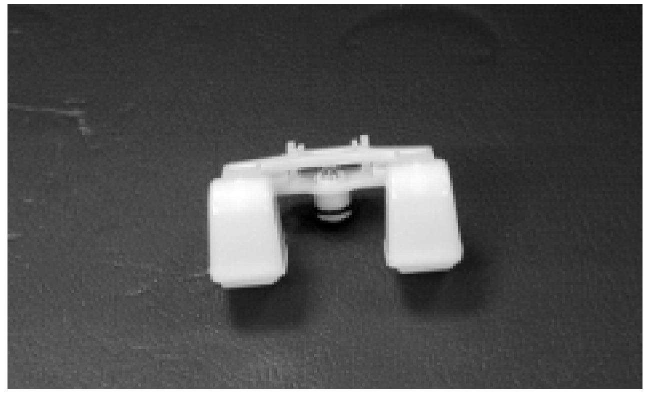
Fig. 4-39



AH620D

7. Remove the float assembly by lifting it up and out of the mixing body. Account for the O-ring.

Fig. 4-40



AH621D

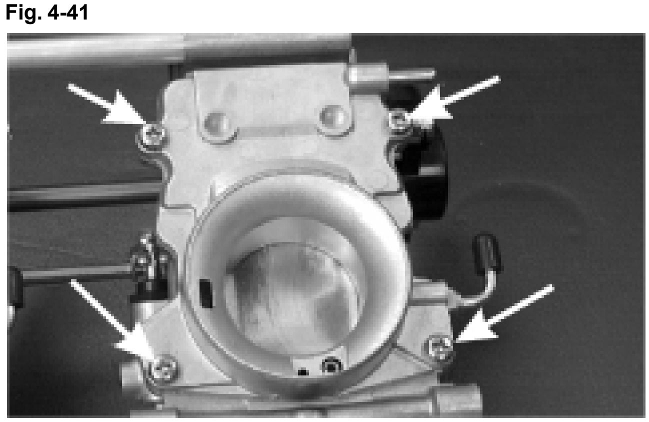
■ **NOTE: It may be necessary to use a spray lubricant such as WD-40 to aid in removing the float assembly.**

⚠ CAUTION

To remove the throttle valve, the jet needle must be removed or damage to the jet needle will result.

8. Remove the Phillips-head screws securing the funnel assembly to the mixing body.

Fig. 4-41

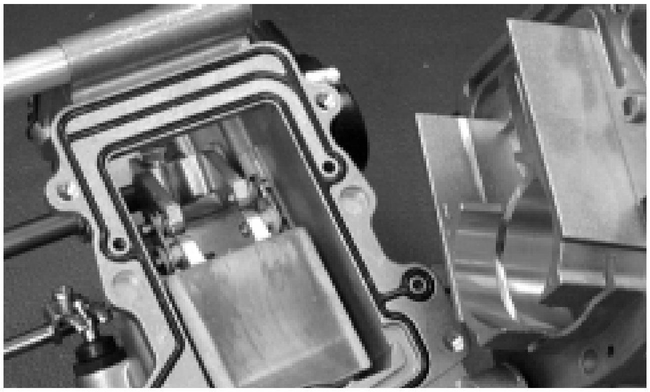


AH622DA

9. Move the throttle lever to the full-open position; then remove the funnel assembly. Account for the gasket.

4

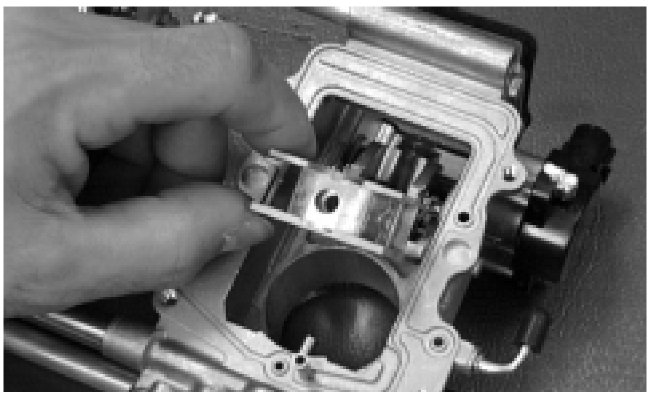
Fig. 4-42



AH623D

10. Move the throttle lever slightly open; then rotate the throttle valve out of the mixing body.

Fig. 4-43



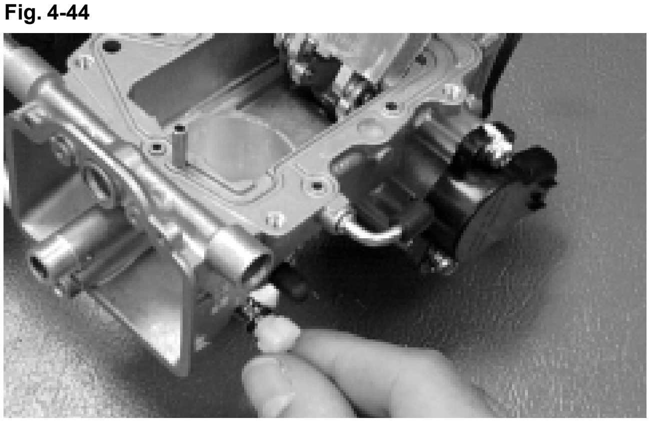
AH624D

11. While counting the rotations for installing purposes, rotate the fuel mixture screw clockwise until lightly seated; then remove the mixture screw. Account for a rubber washer, washer, spring, and cap.

⚠ CAUTION

Do not force a mixture screw when seating. Forcing a mixture screw may result in damage to the screw taper and/or mixing body.

Fig. 4-44

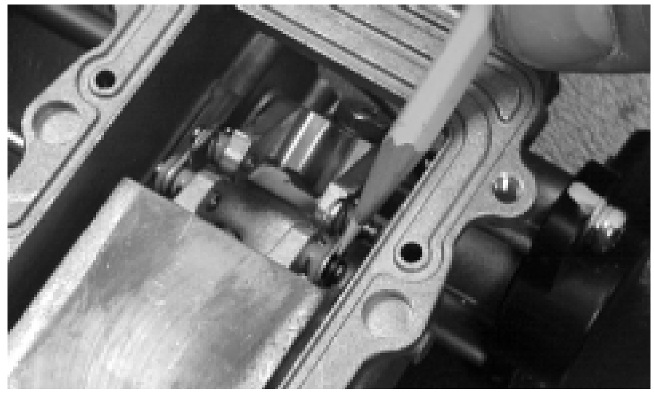


AH626D

■ **NOTE: In the following step, only one E-clip needs to be removed to free the throttle valve from the lever assembly.**

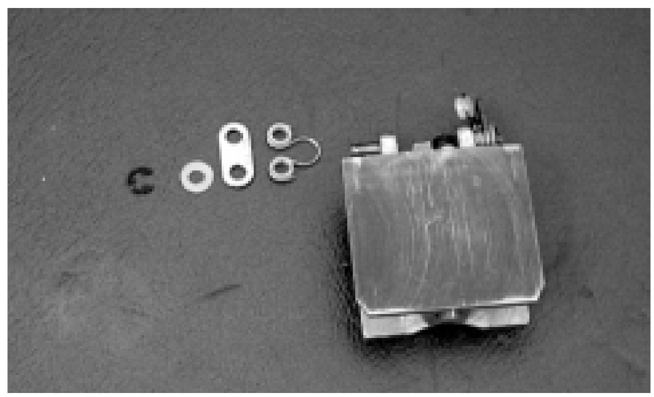
12. Remove the E-clip securing the plate to the throttle valve; then slide the throttle valve to one side and remove. Account for the plate, washer, clip, and bushings.

Fig. 4-45



AH627D

Fig. 4-46



AH628D

Cleaning Carburetor

⚠ CAUTION

DO NOT place any non-metallic components in parts-cleaning solvent or carburetor cleaner because damage or deterioration will result.

1. Place all metallic components in a wire basket and submerge in carburetor cleaner.

2. Soak for approximately 30 minutes; then rinse with fresh parts-cleaning solvent.

3. Wash all non-metallic components with soap and water. Rinse thoroughly.

4. Dry all components with compressed air only making sure all holes, orifices, and channels are unobstructed.

5. Blow compressed air through all hoses to remove any obstructions.

⚠ WARNING

Always wear safety glasses when drying components with compressed air.

⚠ CAUTION

DO NOT use wire or small drill bits to clean carburetor orifices, holes, or channels. Distorted or damaged orifices, holes, or channels can result in poor carburetor operation.

Inspecting Carburetor

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the mixing body for cracks, nicks, stripped threads, and any other imperfections in the casting.

2. Inspect the piston/throttle valve for cracks, score marks, or imperfections in the casting.

3. Inspect the condition of the piston valve spring (VM-style).

4. Inspect the float for damage.

5. Inspect the gaskets, O-rings, and washers for distortion, tears, or noticeable damage.

6. When applicable, inspect the tips of the idle speed screw, jet needle, pilot air screw, needle valve, and fuel mixture screw for wear, damage, or distortion.

■ **NOTE: On the VM-style when inspecting the inlet needle, inspect the side guides and tip for wear. If the guides show any sign of wear, replace the inlet needle.**

7. Inspect the pilot jet and main jet for obstructions or damage.

8. Inspect the starter plunger and seat for wear or damage.

9. Inspect the carburetor mounting flanges for damage and tightness.

⚠ CAUTION

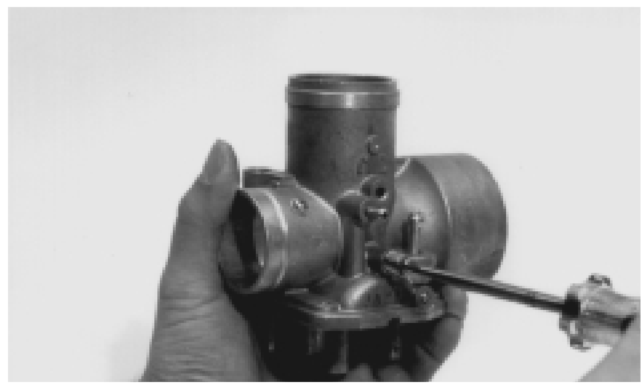
An air leak between the carburetor and engine will cause a lean condition and severe engine damage will result.

10. On the TM-style, inspect the throttle shaft seal for damage and signs of leaking.

Assembling Carburetor (VM-Style)

1. Install the idle speed screw and spring.

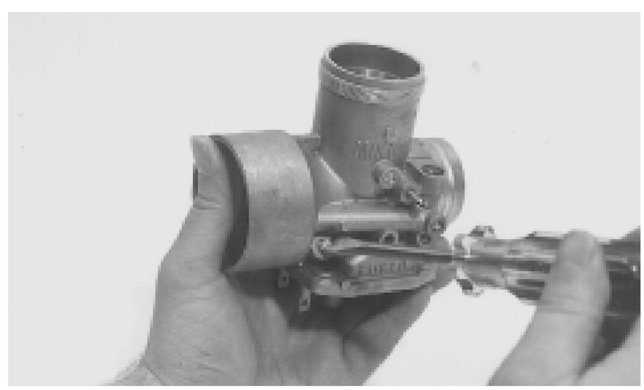
Fig. 4-47



B351

2. Install the pilot air screw and spring. Rotate clockwise until lightly seated; then turn counterclockwise the same number of turns as noted in disassembling for an initial setting.

Fig. 4-48



B350

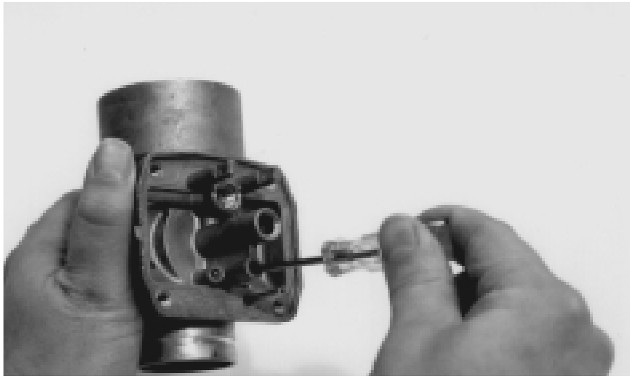
⚠ CAUTION

DO NOT force the pilot air screw when seating. Forcing the screw will result in damage to the carburetor body.

3. Install the pilot jet.

4

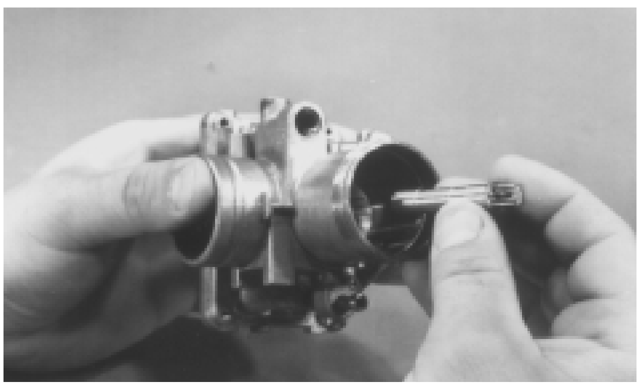
Fig. 4-49



B352

4. Insert the needle jet into position from the top of the carburetor making sure the groove in the needle jet is aligned with the pin in the mixing body; then place the jet extender, baffle ring, and main jet into position and secure.

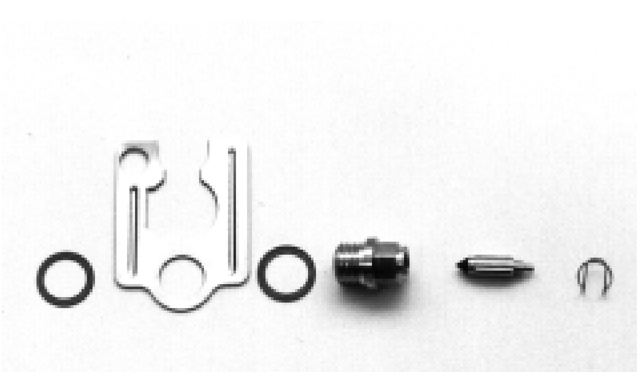
Fig. 4-50



AH084

5. In order, place a washer, plate, washer, and inlet seat into position and secure. Install the inlet needle valve and secure with the retainer.

Fig. 4-51



B347

6. Place the float arm into position and secure with the pin.

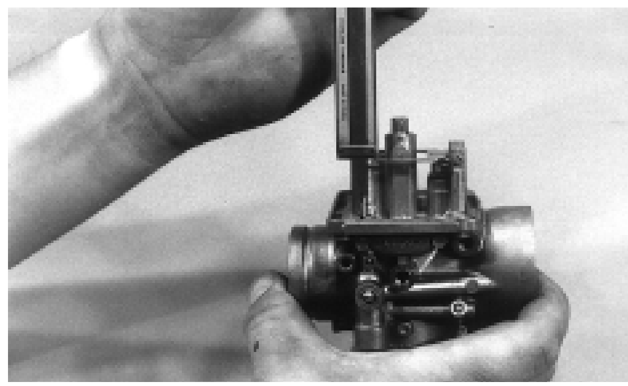
Fig. 4-52



AH138

7. Check the float arm height. Using a calipers, measure the distance from the gasket surface to the top of the float arm (with the carburetor inverted). If measurement is not within specifications, adjust by bending the actuating tab.

Fig. 4-53

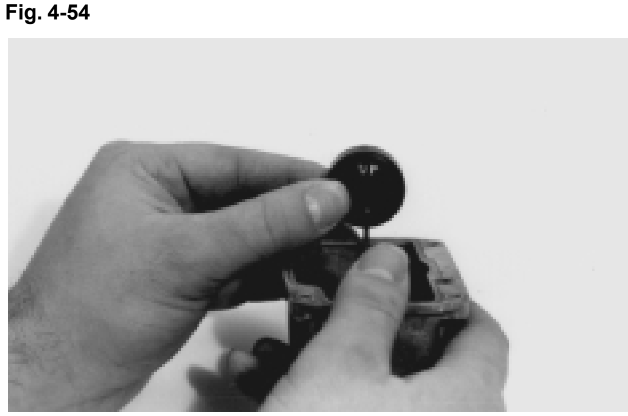


AH046

FLOAT ARM HEIGHT	
VM-32/34	22-24 mm (0.86-0.94 in.)
VM-36/38	17-19 mm (0.66-0.74 in.)

8. Place the O-ring and drain plug into position and secure; then place the floats into position making sure the word UP is properly positioned. Press the caps onto the float towers.

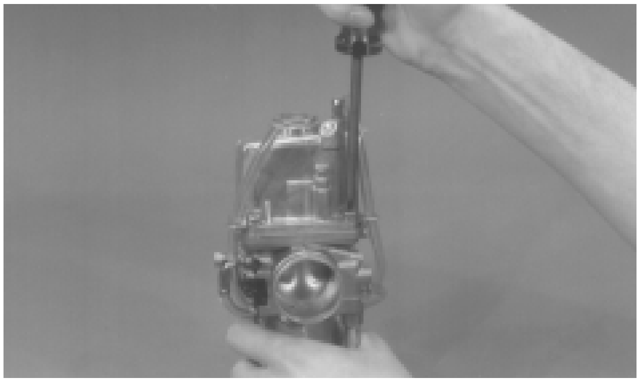
Fig. 4-54



B344

9. Place the gasket and float chamber into position and secure with the four screws and lock washers making sure the hose plates are properly positioned on the two front screws. Install the vent hoses.

Fig. 4-55

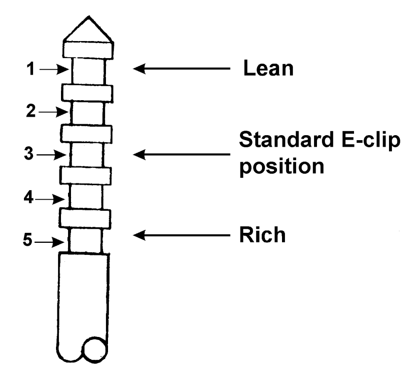


AH137

10. Place the E-clip into position on the jet needle. From the bottom of the jet needle, slide the E-clip washer up against the E-clip. Place the jet needle into the piston valve. Place an E-clip washer on the jet needle above the E-clip.

■ **NOTE: Place the E-clip in the proper position as noted in disassembly.**

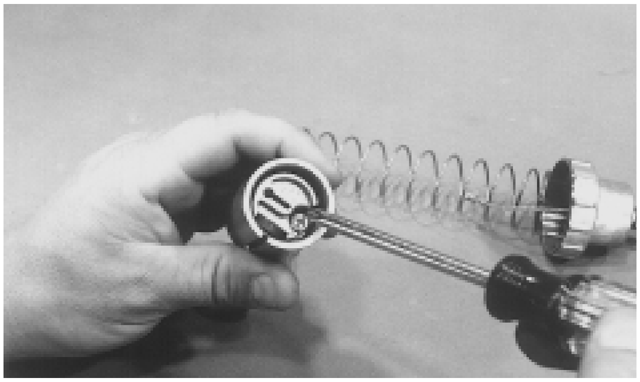
Fig. 4-56



725-266C

11. Place the cable retainer into the piston valve and secure with the Phillips-head screw. Place the spring and plate over the throttle cable and compress the spring. Guide the cable end down into the cable retainer slot and slide the cable end to the center of the piston valve. Release the spring and retainer plate to lock the cable in position.

Fig. 4-57



AH075

■ **NOTE: The round part of the cable end must come through the hole in the plate. If it doesn't, the cable isn't assembled to the piston valve correctly.**

12. Thread the plunger cap onto the choke cable. Place the spring over the cable end and compress. Position the cable end into the starter plunger and release the spring.

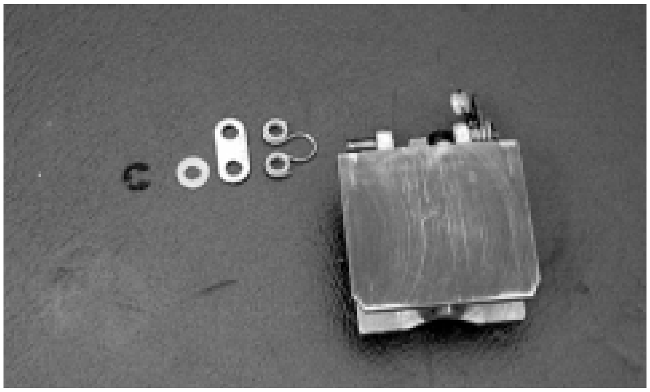
Assembling Carburetors (TM-Style)

4

1. Place the throttle valve into the mixing body making sure the cutaway faces the funnel assembly side; then slide the bushing assembly/plate onto the lever assembly. Secure the assembly with the remaining bushings with clip, plate, washer, and E-clip.

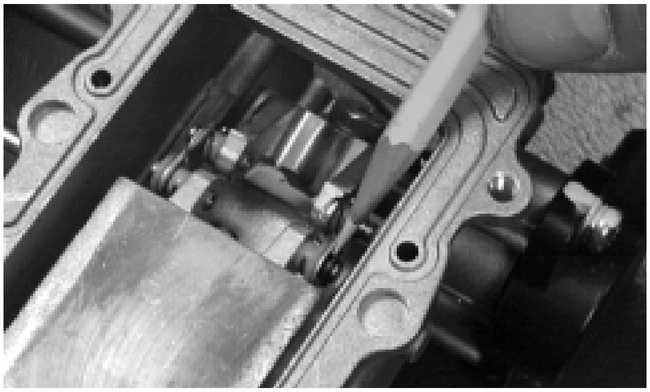
■ **NOTE: When installing the throttle valve, the cutaway must face the funnel assembly side.**

Fig. 4-58



AH628D

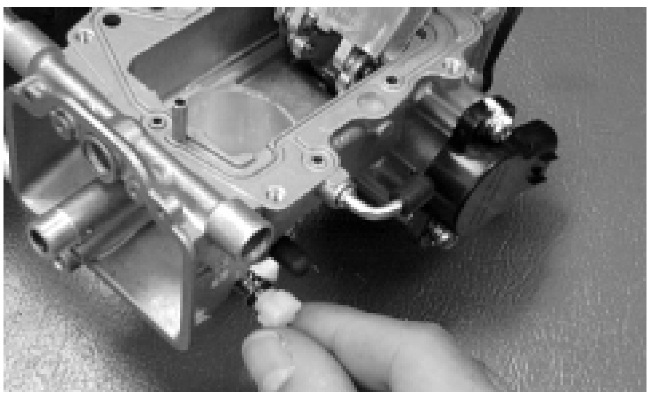
Fig. 4-59



AH627D

2. Making sure the cap, spring, washer, and rubber washer are accounted for from disassembly, install the fuel mixture screw in the mixing body.

Fig. 4-60



AH626D

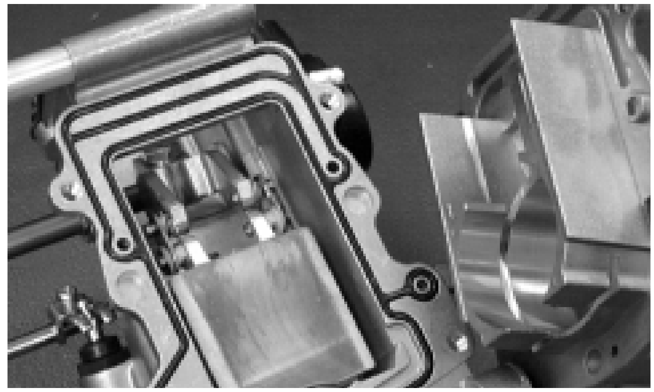
3. Rotate the fuel mixture screw clockwise until lightly seated; then rotate the mixture screw counterclockwise the same number of turns as noted in disassembling for an initial setting.

⚠ CAUTION

Do not force the mixture screw when seating. Forcing the mixture screw may result in damage to the screw taper and/or mixing body.

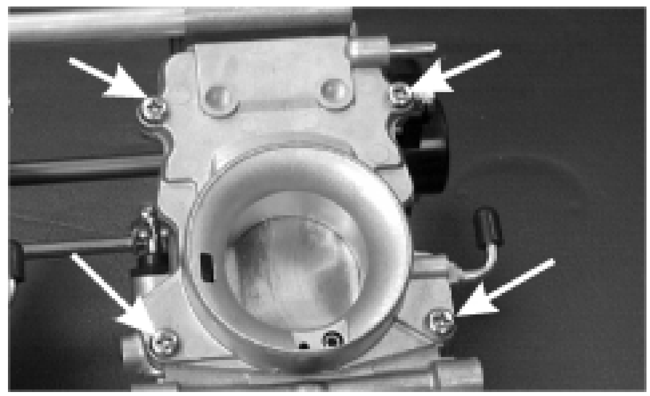
4. Move the throttle lever to the full-open position; then secure the funnel assembly w/gasket to the mixing body.

Fig. 4-61



AH623D

Fig. 4-62



AH622D

5. Accounting for the O-ring from disassembly, install the float assembly by pressing in on the screw mounting holes; then secure the float assembly with the screws.

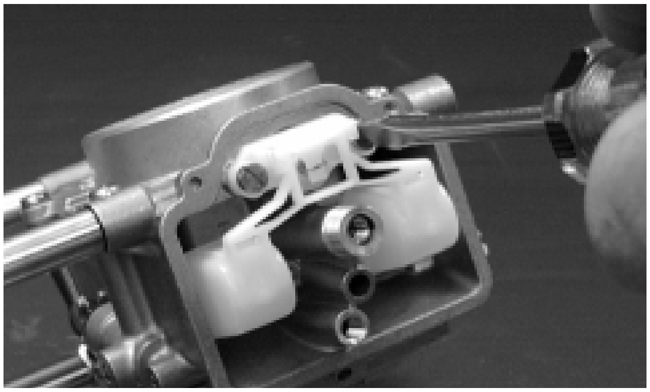
■ NOTE: It may be necessary to use a spray lubricant such as WD-40 to aid in installing the float assembly.

Fig. 4-63



AH621D

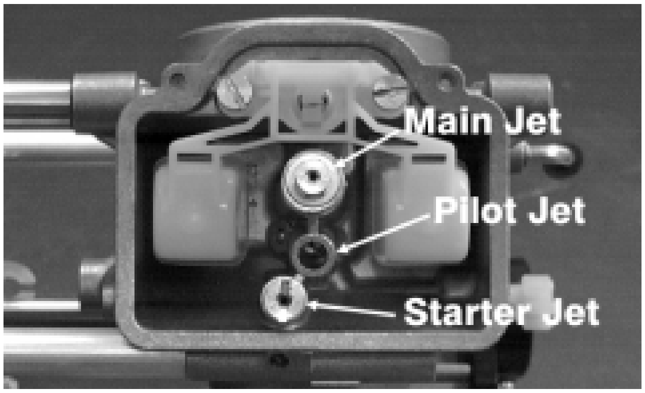
Fig. 4-64



AH620D

6. Install the starter jet, pilot jet, and main jet (with washer).

Fig. 4-65



AH619D

7. Place the float chamber and O-ring into position on the mixing body; then secure with the screw and drain plug (with O-ring).

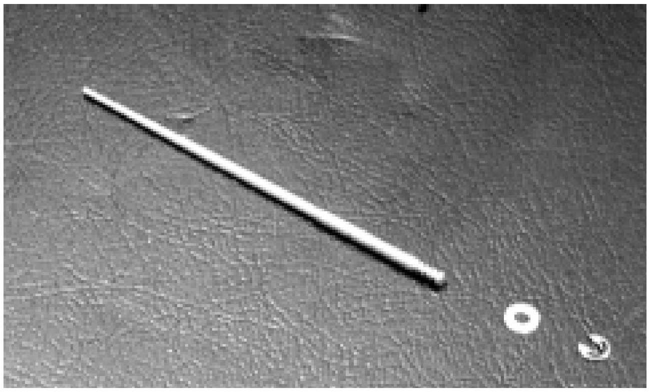
Fig. 4-66



AH618D

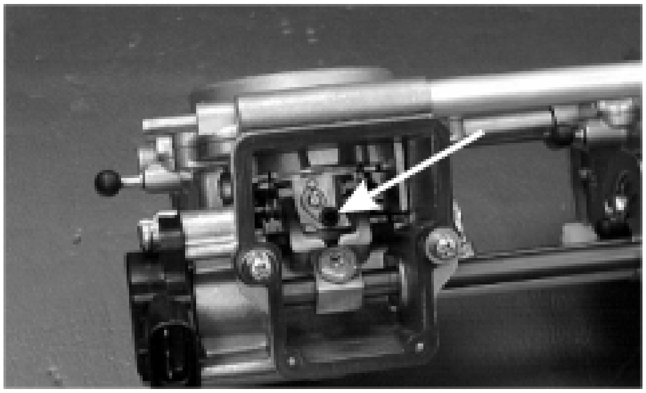
8. Place the washer and E-clip (above the washer) onto the jet needle; then install the jet needle assembly into the mixing body. Secure with the retaining plate and screw.

Fig. 4-67



AH617D

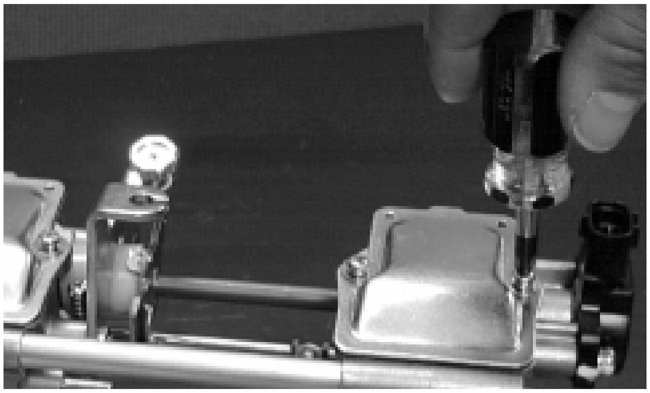
Fig. 4-68



AH616DA

9. Place the top cap and gasket on the mixing body; then secure with the screws (with washers).

Fig. 4-69



AH615D

■ **NOTE: If the lever assembly was loosened from the throttle lever shaft, the carburetors must be synchronized.**

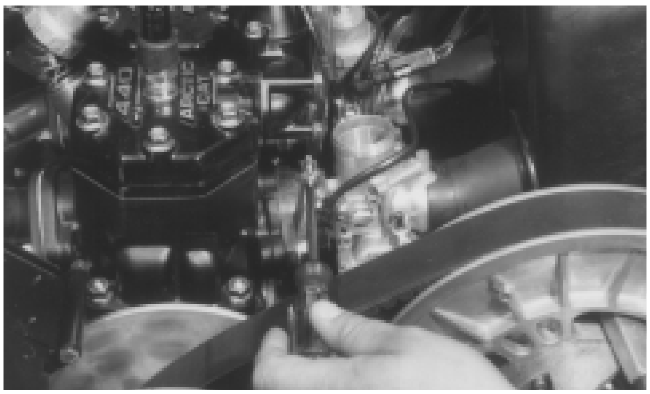
4

Installing Carburetor (VM-Style)

■ **NOTE: On twin and triple carburetor models, install the carburetors using this basic procedure.**

1. Place the carburetor into position in the flange and air-intake silencer boot; then tighten the flange clamp making sure the carburetor is level. Do not over-tighten the flange clamp as it will damage the carburetor flange.

Fig. 4-70



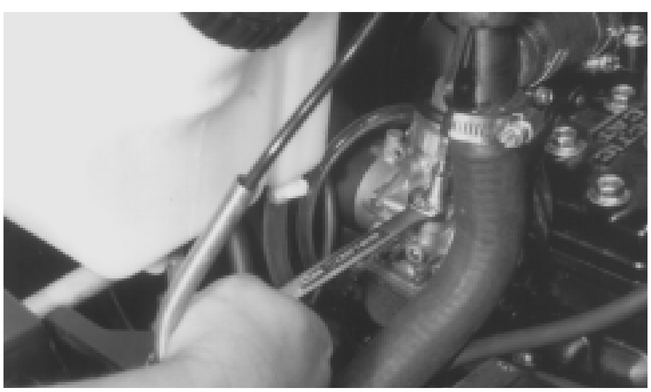
AH103

■ **NOTE: Slide the carburetor into the air-intake silencer boot; then slide the carburetor into the flange.**

2. Connect the fuel hose to the carburetor inlet fitting.

3. Thread the brass choke-cable housing into the carburetor making sure the washer is properly positioned and tighten securely.

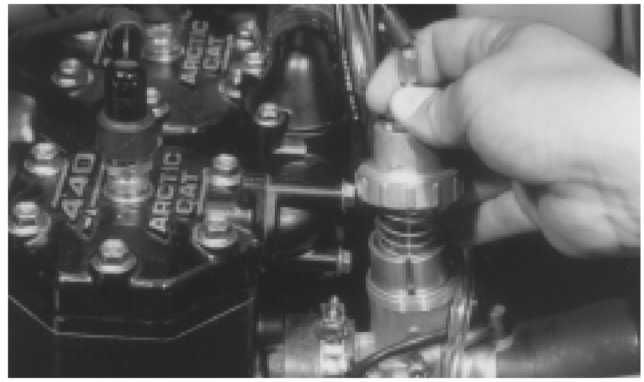
Fig. 4-71



AH099

4. Place the piston valve into position making sure the full-length groove in the piston valve is aligned with the pin in the mixing chamber bore.

Fig. 4-72



AH100

5. Secure the mixing body top by tightening the screw and lock washer making sure the mixing body top plate is properly positioned.

6. If applicable, connect the safety switch harness to the main wiring harness.

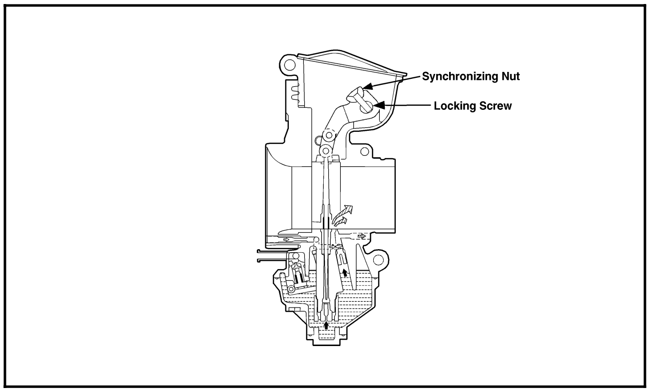
7. Turn the fuel shut-off valve to the OPEN position.

8. Adjust the carburetors (see appropriate Adjusting Carburetors in this sub-section).

Installing Carburetors (TM-Style)

1. Prior to installing the carburetors, the carburetor throttle valves must be checked for synchronization.
   A. With the throttle in the idle position, select a small drill bit that will just fit under the cutaway of the fixed throttle valve.
   B. Using the same drill bit, check the clearance under the adjustable throttle valve cutaway. If clearance is different from the first carburetor checked, adjust the throttle valve by loosening the lever ring locking screw; then using an open-end wrench, rotate the synchronizing nut in either direction until the clearance is the same as the first carburetor checked.

Fig. 4-73



0734-445

C. After synchronization has been attained, hold the synchronizing nut with the open-end wrench and tighten the lever ring locking screw.

2. Place the carburetors (with air jet and float chamber vent hoses) in the engine compartment and into the carburetor boot; then tighten the clamps.

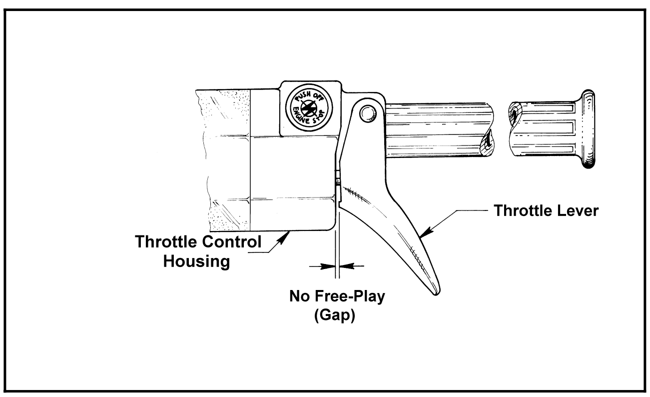
■ NOTE: If the air jet hoses are not properly installed, the jets may become plugged from ice and snow buildup.

3. Connect the fuel supply hose to the fuel inlet T-fitting.

4. Connect the throttle cable and choke cables.

5. At this point, there must be no free-play gap in the throttle lever.

Fig. 4-74



733-081D

■ NOTE: If throttle cable free-play is incorrect, the throttle safety switch will be activated prematurely and the engine will not start.

■ NOTE: If cable free-play must be corrected, utilize the jam nuts on the throttle cable bracket until no free-play is attained.

6. Place the air-intake silencer into position in the engine compartment making sure the carburetors are properly positioned in the boot and secure with screws.

7. Place the ignition coil/fuel pump mounting plate into position on the air-intake silencer and secure with the machine screw and washer.

Fig. 4-75



AN613D

8. Adjust the carburetors (see appropriate Adjusting Carburetors in this sub-section).

Adjusting Carburetor(s)
(VM-Style)

⚠ CAUTION

The air-intake silencer and boots must be in position whenever the engine is run. If the silencer is removed and the engine is run, a lean condition will result. Therefore, DO NOT run the engine when the air-intake silencer is removed.

ADJUSTING CHOKE CABLE(S)

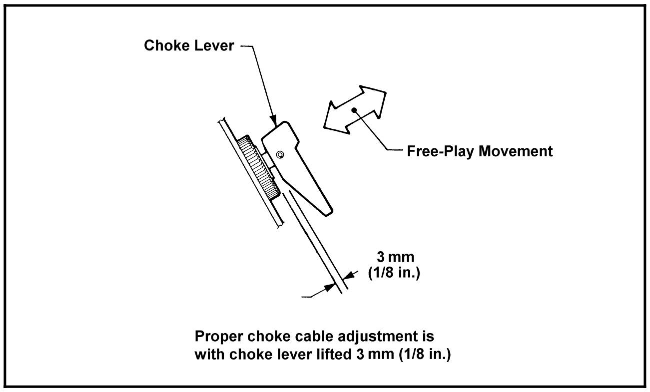
1. Be sure the ignition switch key is in the OFF position and the brake lever lock is set.

2. Loosen the jam nut securing the choke cable adjuster. Rotate the choke cable adjuster clockwise until it bottoms against the brass plunger cap.

3. Slowly rotate the choke cable adjuster counterclockwise while checking the choke lever for free-play. As soon as all free-play has been removed from the end of the lever, stop rotating the adjuster.

4. With free-play removed from the lever, slowly rotate the choke cable adjuster once again clockwise while checking the choke cable lever for free-play. Adjust until 3 mm (1/8 in.) free-play between front bottom edge of lever and housing is attained. Securely tighten the adjuster jam nut.

Fig. 4-76



5. On twin and triple models, repeat steps 3 and 4 on each carburetor.

■ **NOTE: On twin and triple models if a carburetor choke cable is adjusted too tight, the engine will only operate on 1 cylinder at idle.**

ADJUSTING PISTON VALVE(S)

■ **NOTE: On some models, the air-intake silencer is a one-piece unit, and the silencer boot(s) can be removed to access the intake bore(s). Remove the boots; then proceed to step 4.**

■ **NOTE: On some models, the air-intake silencer includes a cover/tool tray assembly and a baffle/resonator, and the silencer boot cannot be removed to access the intake bores. Proceed to step 1.**

1. Open the air-intake silencer cover; then remove the 3 Phillips-head screws securing the cover/tool tray assembly to the silencer.

2. Tip the cover/tool tray assembly forward and out of its slots and remove the assembly.

3. Using a large flat-blade screwdriver, remove the resonator tabs from the air-intake silencer slots and remove the resonator to access the intake bores.

■ **NOTE: The resonator can be removed more easily by removing the back tabs first.**

4. Rotate each idle speed screw counterclockwise until all spring tension is removed.

5. Loosen the jam nut securing each throttle cable swivel adapter; then rotate the swivel adapter clockwise until the piston valve bottoms in the piston valve bore.

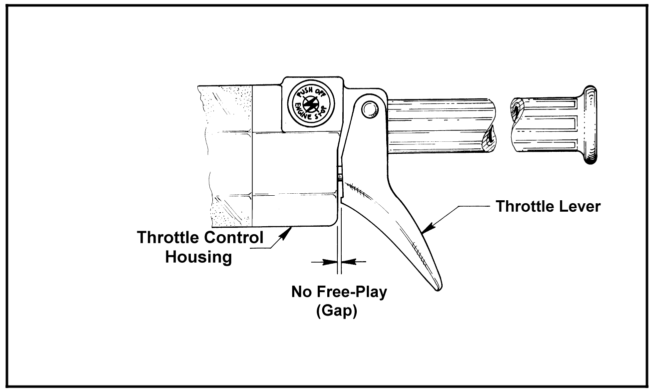
6. In turn on each carburetor, place a finger lightly against the side of the piston valve; then rotate the carburetor swivel adapter counterclockwise until slight upward movement of the valve is noted.

7. In turn on each carburetor, place a finger against either piston valve. Rotate the idle speed screw clockwise until it contacts the valve.

8. Compress the throttle lever to the full-open position; then rotate each idle speed screw clockwise 2 complete turns. Release the throttle lever.

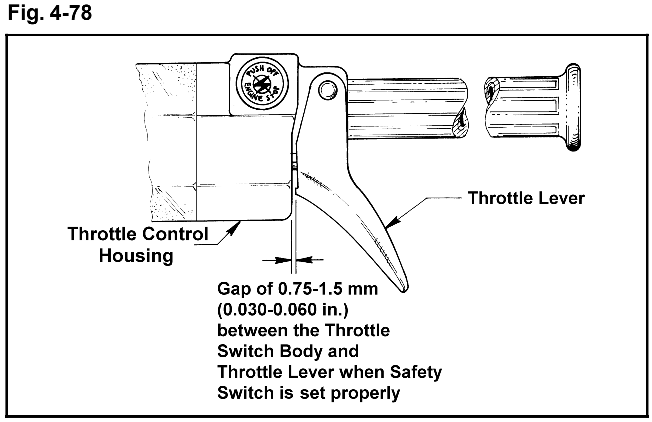
■ **NOTE: On single carburetor models, the throttle control is equipped with a 2-wire throttle control switch connector. There must be no free-play between the lever and the control housing.**

Fig. 4-77



■ **NOTE: On twin and triple models, the throttle control is equipped with a 3-prong emergency stop switch connector. There must be 0.75-1.5 mm (0.030-0.060 in.) free-play between the lever and the control housing.**

Fig. 4-78



■ **NOTE: If cable free-play gap is not correct, rotate each swivel adapter an equal amount until recommended free-play is achieved. Each piston valve must be resting against the tip of its idle speed screw.**

■ **NOTE: On twin and triple models if throttle cable free-play is incorrect, the carburetor safety switches will be activated prematurely and the engine will not start.**

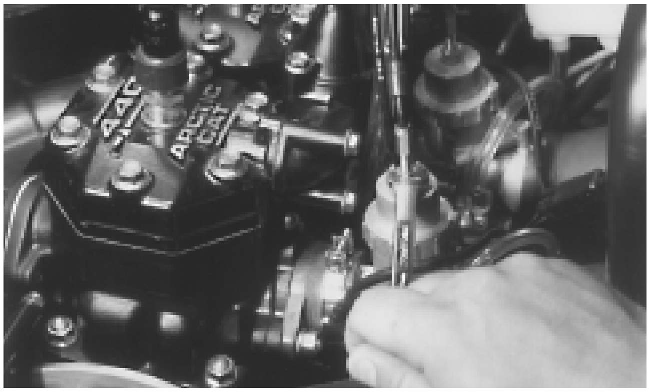
9. On some models, install the air-intake silencer boot(s); on some models, install the baffle/resonator and the cover/tool tray assembly.

SYNCHRONIZING PISTON VALVES (Sight Glass Method)

■ **NOTE: Arctic Cat recommends using the Carburetor Synchronizer (p/n 0644-069). If the carburetor synchronizer is not available, use the following procedure.**

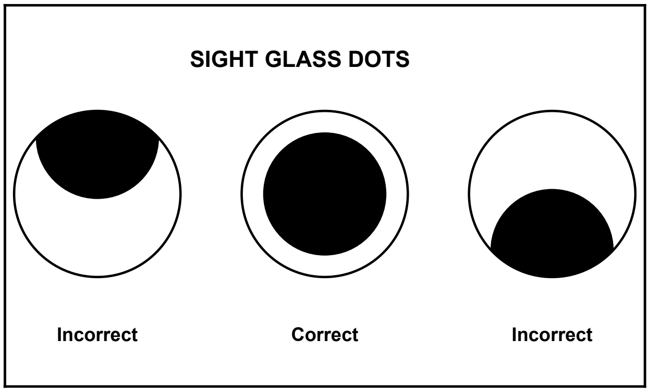
1. Compress the throttle lever until the dot in each sight glass on the side of the carburetors is visible.
2. Rotate each swivel adapter until the dots are equally centered in each sight glass.

Fig. 4-79



AL127D

Fig. 4-80



0000-084

■ **NOTE: It is important that the dots are entirely within sight glasses, are as equally centered as possible in the sight glasses, and that one dot is not significantly higher or lower than another.**

3. With the piston valves synchronized, tighten the swivel adapter jam nuts securely. Slide the rubber throttle cable caps down over the swivel adapters.

■ **NOTE: There must be free-play in the throttle lever on all models using carburetor safety switches.**

> ⚠ **WARNING**
>
> **Be sure to tighten the swivel adapter jam nuts securely. If a swivel adapter jam nut is not tightened, the adjuster can rotate out of the carburetor cap causing the piston valve not to return to the full-closed position.**

SYNCHRONIZING PISTON VALVES (Mechanical Method)

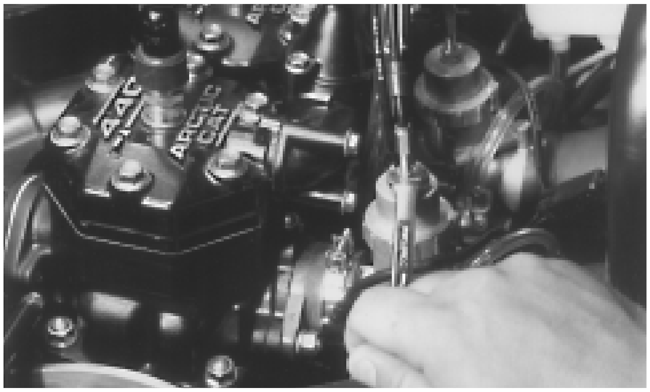
■ **NOTE: Arctic Cat recommends using the Carburetor Synchronizer (p/n 0644-069). If the carburetor synchronizer is not available, use the following procedure.**

1. Open the air-intake silencer cover; then remove the 3 Phillips-head screws securing the cover/tool tray assembly to the silencer.
2. Tip the cover/tool tray assembly forward and out of its slots and remove the assembly.
3. Using a large flat-blade screwdriver, remove the resonator tabs from the air-intake silencer slots and remove the resonator to access the intake bores.

■ **NOTE: The resonator can be removed more easily by removing the back tabs first.**

4. Check to make sure the piston valves start to open at the exact same moment by placing a thumb and finger against the valves; then lightly compress the throttle lever.
5. With slight pressure being applied to the throttle lever, the piston valves should start to open at the exact same time. Compress and release the throttle lever several times to assure accurate determination of piston valve opening.
6. If a piston valve starts to open before another, rotate the swivel adapter on the valve which is lifting first clockwise, just enough to synchronize the valves. Recheck by repeating steps 4-6.
7. Tighten the swivel adapter jam nuts securely. Slide the rubber throttle cable caps down over the swivel adapters.

Fig. 4-81



AL127D

■ **NOTE: There must be free-play in the throttle lever on all models using carburetor safety switches.**

⚠ WARNING

Be sure to tighten the swivel adapter jam nuts securely. If a swivel adapter jam nut is not tightened, the adjuster can rotate out of the carburetor cap causing the piston valve not to return to the full-closed position.

8. After synchronization has been attained, install the resonator and cover/tool tray assembly.

ADJUSTING PILOT AIR SCREW(S)

1. While counting the rotations, carefully rotate each pilot air screw clockwise until lightly seated.

Fig. 4-82



AH006

⚠ CAUTION

Do not force a pilot air screw when rotating it clockwise; damage to the pilot air screw needle tip will result.

2. Rotate each pilot air screw counterclockwise the same number of turns as noted in step 1 for an initial setting.

3. Synchronize the oil-injection pump (see Related Items in this section).

ADJUSTING ENGINE IDLE SPEED

1. With the snowmobile on a shielded safety stand, start the engine, release the brake lever lock, and thoroughly warm up. "Fine-tune" each idle speed screw and each pilot air screw until the engine idles smoothly at the desired RPM (1500 RPM is recommended).

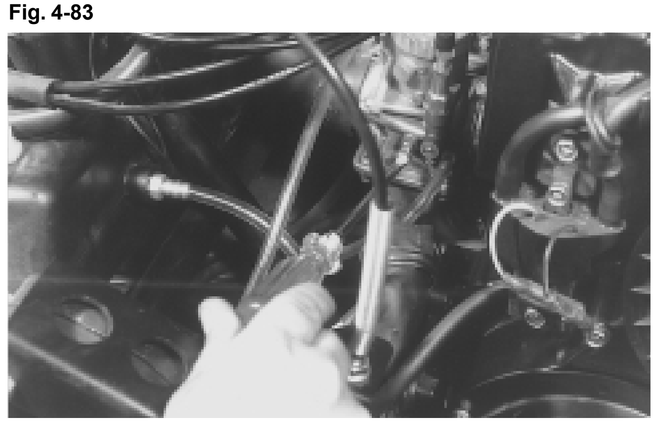
■ **NOTE: Make engine idle adjustment only after the engine has reached running temperature. Since the idle speed screw(s) have not been adjusted, apply slight throttle pressure to keep the engine running. Allow engine to warm up for 2-3 minutes.**

2. On twin and triple models after the engine has been allowed to warm up for 2-3 minutes, adjust engine idle by first rotating the PTO-side carburetor idle speed screw clockwise until the tachometer reads 1480 RPM.

■ **NOTE: On triple models, rotate the center carburetor idle speed screw clockwise until the tachometer reads 1500 RPM.**

3. On twin and triple models, rotate the MAG-side carburetor idle speed screw clockwise until tachometer reads 1500 RPM.

Fig. 4-83



AH055

4. On twin and triple models, rotate the PTO-side carburetor idle speed screw clockwise until the tachometer reads slightly above 1500 RPM; then rotate the idle speed screw counterclockwise to achieve exact 1500 RPM reading. The piston valves should now be synchronized and the engine should idle without holding any throttle pressure.

■ **NOTE: If the engine has no ignition spark with the throttle in the idle position but has proper spark with the throttle lever slightly compressed, the carburetor safety switches must be repositioned (see Section 5).**

5. Test the throttle control lever by compressing and releasing it several times. The lever must return to the idle position quickly and completely.

⚠ WARNING

DO NOT operate the snowmobile when any component in the throttle system is damaged, frayed, kinked, worn, or improperly adjusted. If the snowmobile is operated when the throttle system is not functioning properly, personal injury could result.

Adjusting Carburetors
(TM-Style)

⚠ CAUTION

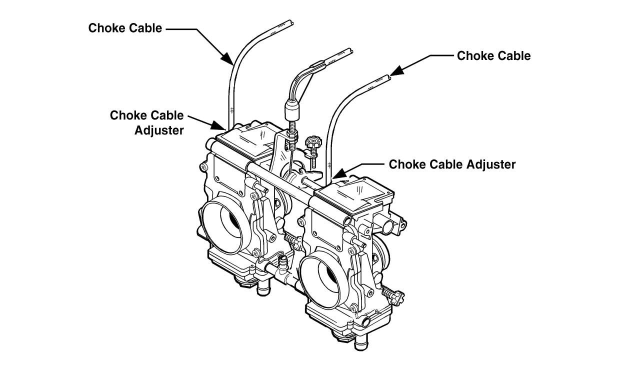
The air-intake silencer and boots must be in position whenever the engine is run. If the silencer is removed and the engine is run, a lean condition will result. Therefore, DO NOT run the engine when the air-intake silencer is removed.

ADJUSTING CHOKE CABLES (Twin)

1. Be sure ignition switch key is in the OFF position and the brake lever lock is set.

2. Loosen the jam nut securing each choke cable adjuster.

Fig. 4-84

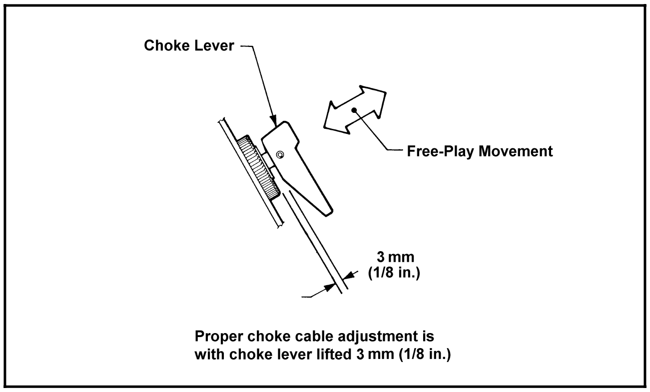


734-496A

3. Slowly rotate one choke cable adjuster while checking the choke lever for free-play. As soon as all free-play has been removed from the end of the choke lever, stop rotating the adjuster.

4. With free-play removed from the lever, slowly rotate the adjuster again while checking the choke lever for free-play. Adjust until 3 mm (1/8 in.) free-play between front bottom edge of lever and housing is attained. Securely tighten the jam nut.

Fig. 4-85



0732-848

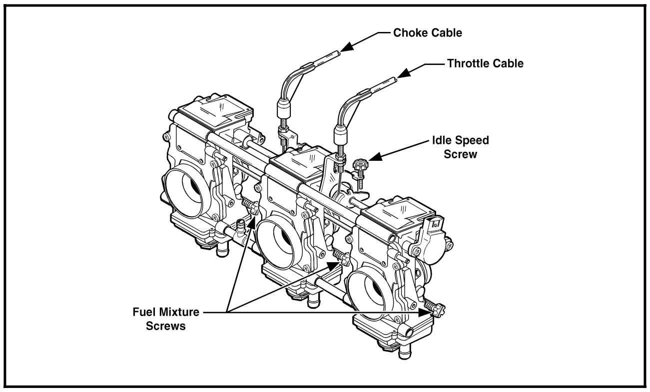
5. Repeat steps 3 and 4 on the other carburetor.

ADJUSTING CHOKE CABLE (Triple)

1. Be sure ignition switch key is in the OFF position and the brake lever lock is set.

2. Loosen the jam nuts securing the choke cable to the bracket at the carburetor.

Fig. 4-86



0734-317

3. Slowly rotate one jam nut while checking the choke lever for free-play. As soon as all free-play has been removed from the end of the choke lever, stop rotating the jam nut.

4. With free-play removed from the lever, slowly rotate the jam nut again while checking the choke lever for free-play. Adjust until 3 mm (1/8 in.) free-play between front bottom edge of lever and housing is attained. Securely tighten the jam nuts.

SYNCHRONIZING THROTTLE VALVES

1. Open the air-intake silencer cover; then remove the 3 Phillips-head screws securing the cover/tool tray assembly to the silencer.

2. Tip the cover/tool tray assembly forward and out of its slots and remove the assembly.

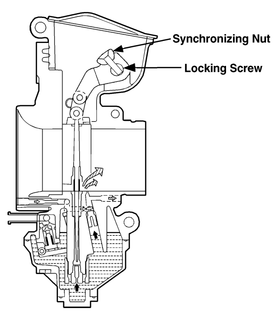
3. Using a large flat-blade screwdriver, remove the resonator tabs from the air-intake silencer slots and remove the resonator to access the intake bores.

■ **NOTE: The resonator can be removed more easily by removing the back tabs first.**

4. With the throttle in the idle position, select a small drill bit that will just fit under the cutaway of the fixed throttle valve.

5. Using the same drill bit, check the clearance under each adjustable throttle valve cutaway. If clearance is different from the first carburetor checked, adjust the throttle valve by loosening the lever ring locking screw; then using an open-end wrench, rotate each synchronizing nut in either direction until the clearance is the same as the first carburetor checked.

Fig. 4-87



0734-445

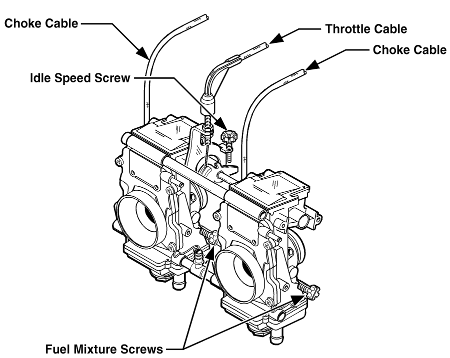
6. After synchronization has been attained, hold the synchronizing nut with the open-end wrench and tighten the lever ring locking screw.

7. Install the resonator and cover/tool tray assembly.

ADJUSTING FUEL MIXTURE SCREWS

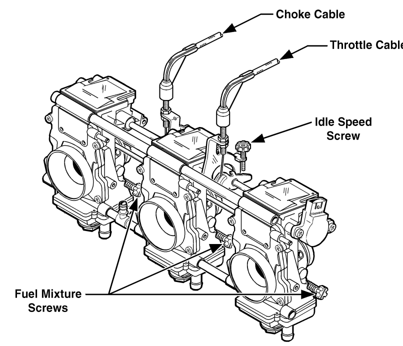
1. While counting the rotations, carefully rotate the fuel mixture screws clockwise until lightly seated.

Fig. 4-88



734-496B

Fig. 4-89



0734-317

⚠ CAUTION

Do not force a fuel mixture screw when rotating it clockwise; damage to the mixture screw taper may result.

2. Rotate each fuel mixture screw counterclockwise the same number of turns as noted in step 1 for an initial setting.

ADJUSTING ENGINE IDLE SPEED

■ **NOTE: Make engine idle adjustment only after the engine has reached running temperature. Since the idle speed screw has not been adjusted, apply slight throttle pressure to keep the engine running. Allow engine to warm up for 2-3 minutes.**

1. After the engine has been allowed to warm up for 2-3 minutes, fine-tune the idle speed screw until the tachometer reads 1500 RPM.

2. Test the throttle control lever by compressing and releasing it several times. The lever must return to the idle position quickly and completely.

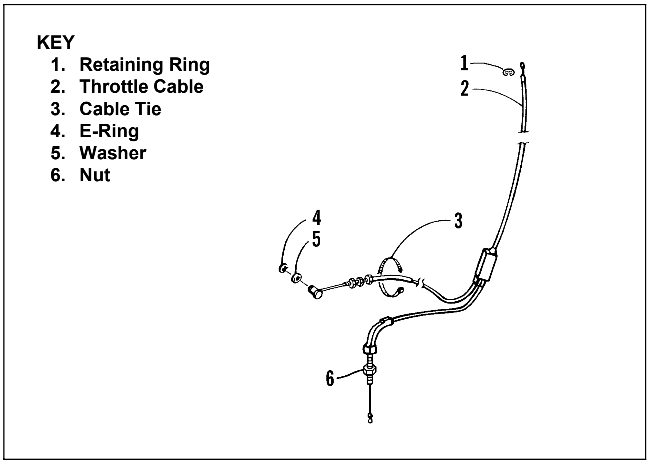
⚠ WARNING

DO NOT operate the snowmobile when any component in the throttle system is damaged, frayed, kinked, worn, or improperly adjusted. If the snowmobile is operated when the throttle system is not functioning properly, personal injury could result.

Throttle Cable
(VM-Style)

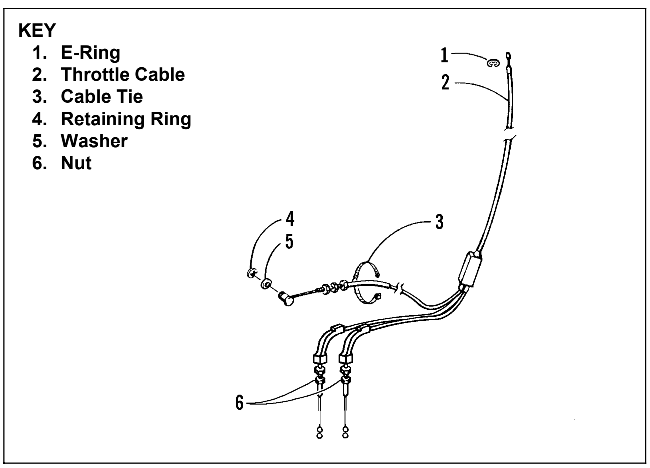
REMOVING

Fig. 4-90



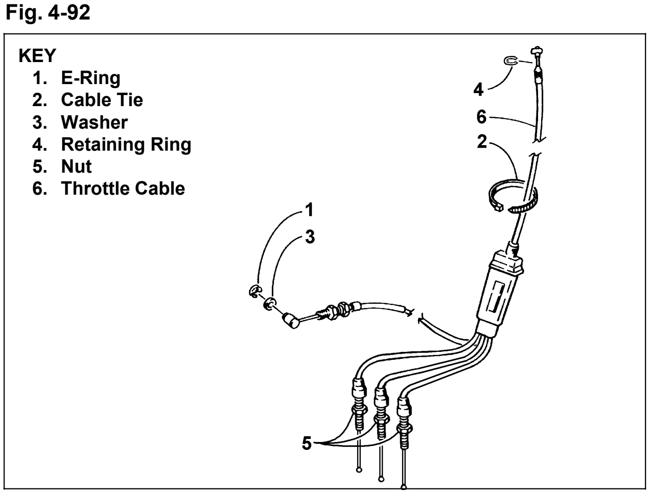
734-533A

Fig. 4-91



734-609A

Fig. 4-92



733-420B

1. Loosen the throttle cable adjuster jam nuts.
2. Remove the mixing body tops.
3. Remove the throttle cables from the piston valves.
4. Remove the throttle cables from the mixing body tops.
5. Remove the handlebar pad and console.
6. Remove the cable ties securing the throttle cable.
7. Remove the throttle cable end from the throttle lever.
8. Remove the retaining ring securing the cable to the throttle switch assembly; then remove the cable from the throttle switch assembly.
9. On twin and triple carburetor models, it may be necessary to remove the PTO-side carburetor.
10. Remove the E-ring securing the oil-injection cable to the control arm. Account for a washer.
11. Loosen the jam nut securing the adjustment cable; then remove the cable from the oil-injection pump.

INSTALLING

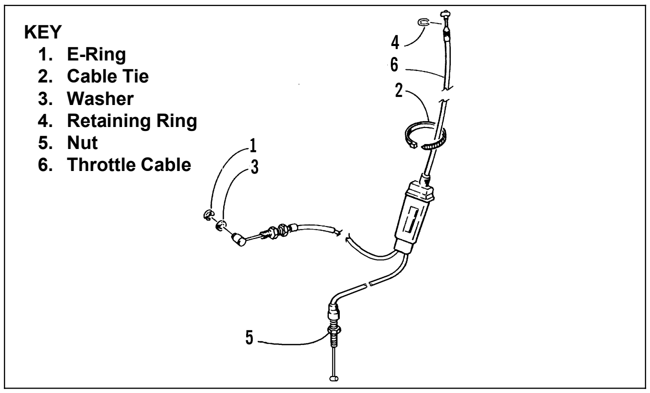
1. Route the throttle cable from the throttle switch assembly to the carburetors and oil-injection pump; avoid any sharp bends or moving parts.
2. Install the oil-injection adjustment cable on the oil-injection pump; secure with the jam nuts.
3. Install the oil-injection cable on the control arm; secure with a washer and E-ring.
4. Install the PTO-side carburetor if removed.
5. Install the throttle cable into the throttle switch assembly. Secure with a retaining ring.
6. Install the throttle cable end on the throttle lever.
7. Secure the throttle cable to the steering post with cable ties.
8. Install the handlebar pad and console.
9. Attach the throttle cable to each throttle valve. The valve must seat in the groove of the throttle cable end; then thread the throttle cable into each mixing body top.
10. Install each piston valve and mixing body top on the carburetor(s). Tighten securely.
11. Adjust the carburetor(s) (see appropriate Adjusting Carburetors in this sub-section).

> ⚠ **CAUTION**
>
> **Compress the throttle control lever to ensure free movement. If the throttle cable sticks or binds, correct the problem before starting the engine.**

12. Synchronize the oil-injection pump (see Related Items in this section).

Throttle Cable
(TM-Style)

Fig. 4-93



734-240A

REMOVING

1. Loosen the throttle cable adjuster jam nuts at the bracket.
2. Remove the throttle cable from the pulley on the throttle lever shaft.
3. Remove the handlebar pad and console.
4. Remove the throttle cable from the throttle lever.
5. Remove the retaining ring securing the cable to the throttle switch assembly; then remove the cable from the throttle switch assembly.
6. Open the belt guard; then remove the drive belt.
7. Remove the E-ring securing the oil-injection cable to the control arm. Account for a washer.
8. Loosen the jam nut securing the adjustment cable; then remove the cable from the oil-injection pump.

INSTALLING

1. Install the oil-injection adjustment cable on the oil-injection pump; secure with the jam nuts.
2. Install the oil-injection cable on the control arm; secure with a washer and E-ring.
3. Route the throttle cable from the carburetor to the throttle switch assembly. Secure with a retaining ring.

> ⚠ **CAUTION**
>
> **Avoid any sharp bends and hot or moving components or damage may occur.**

4. Install the throttle cable on the throttle lever.
5. Install the handlebar pad and console.
6. Install the throttle cable into the throttle lever shaft pulley.
7. Install the throttle cable into the bracket; then adjust the jam nuts to attain no free-play between the throttle lever and the control housing.

■ **NOTE: There must be no free-play between the lever and the control housing.**

> ⚠ **CAUTION**
>
> **Compress the throttle control lever to ensure free movement. If the throttle cable sticks or binds, correct the problem before starting the engine.**

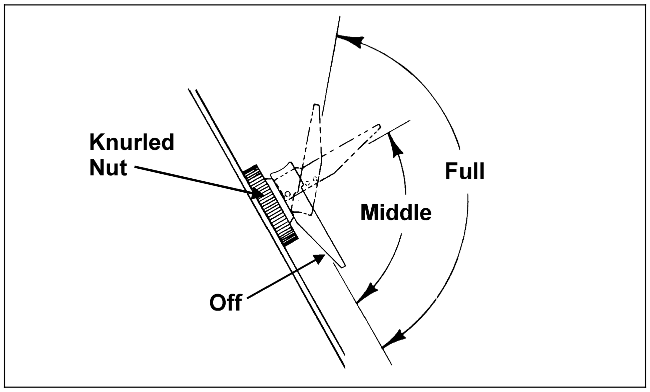
8. Synchronize the oil-injection pump (see Related Items in this section).
9. Install the drive belt; then close and secure the belt guard.

Choke Cable
(VM-Style)

REMOVING

1. Bend down the lock tabs locking each brass choke cable housing on each carburetor.
2. Using a 12-mm wrench, remove each brass choke cable housing from each carburetor. Account for the lock tab washers.
3. Remove each brass plunger and spring from the cable end; then remove each brass choke cable housing.
4. Remove the screws securing the console.
5. Position the choke lever in the middle-choke position; then remove the knurled nut securing the choke lever housing to the console.

Fig. 4-94



725-001A

6. Slide the choke lever housing from the console.

7. Cut any cable ties used to secure the choke cable and remove the choke cable from the engine compartment.

INSTALLING

1. Position the choke lever in the middle-choke position; then from the back side of the console, insert the choke lever housing through the console. Secure with the knurled nut.

2. Route the choke cable from the console to each carburetor; avoid any sharp bends or moving parts.

3. Install each brass choke cable housing onto the cable end; then install each spring and brass plunger.

4. Place the lock tab washer on each brass housing and insert a choke plunger into each carburetor.

5. Thread each brass choke cable housing into each carburetor and tighten. Bend the lock tab up to secure the brass housing. Adjust the choke cable (see appropriate Adjusting Carburetors in this sub-section).

6. Place the console into position and secure with the screws.

Choke Cable (TM-Style)

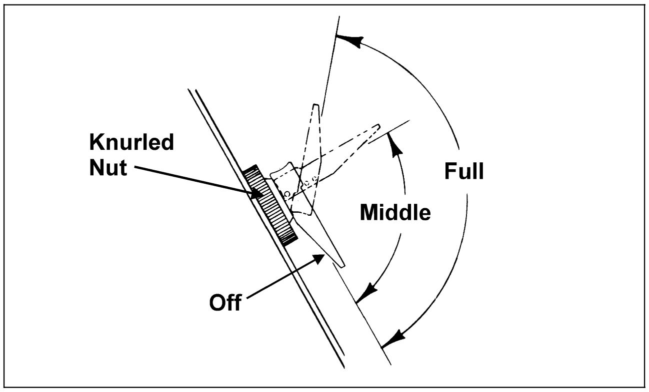
REMOVING

1. Loosen the jam nuts securing the choke cable to the bracket.

2. Remove the cable from the starter plunger lever.

3. Position the choke lever in the middle-choke position; then remove the knurled nut securing the choke housing to the console.

Fig. 4-95



725-001A

4. Remove the console.

5. Slide the choke cable from the console.

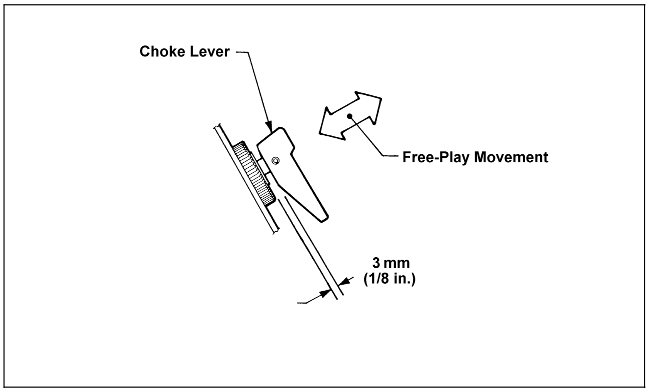
INSTALLING

1. Position the choke lever in the middle-choke position; then from the back side of the console, insert the choke lever housing through the console. Secure with the knurled nut.

2. Route the choke cable from the console to the carburetors; avoid any sharp bends or moving parts.

3. Install the choke cable into the bracket; then secure with jam nuts making sure the choke lever has 3 mm (1/8 in.) free-play between the edge of the lever and the housing.

Fig. 4-96



732-848B

4. Place the console into position and secure.

1999-2000 CARBURETOR SPECIFICATIONS

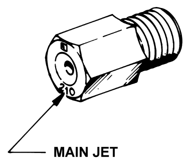
MODEL	TYPE	PRODUCTION MAIN JET[1]	NEEDLE JET	JET NEEDLE		PILOT JET		CUTAWAY		VENT SYSTEM	PILOT CIRCUIT SCREW (TURNS OUT)	
				LOW	HIGH	LOW	HIGH	LOW	HIGH		LOW	HIGH
Panther 340	VM-32	310	P-6 (159)	6DH2-4	6DH2-4	25	35[2]	2.5	2.5	External	1 1/2	1 1/2
Bearcat 340	VM-32	300	P-6 (159)	6DH2-5	6DH2-3[2]	30	35[2]	2.5	2.5	External	1	1
Bearcat 440 I	VM-34	340	P-4 (166)	6DH7-4	6DH7-3[2] 6DH7-2[3]	30	30	3.0	3.0	External	1	1
Panther 440	VM-34	280	P-4 (480)	6DH2-3	6DH2-2[2]	25	30	2.5	2.5	External	1	1
Bearcat 440 II	VM-34	300	P-4 (480)	6DH2-3	6DH2-2[2]	30	30	2.5	2.5	External	1	1
Z 370	VM-32	240	P-6 (159)	6DH7-3	6DH7-3	40	40	2.5	2.5	External	1	1
Z 440	VM-34	320	P-4 (166)	6DH7-4	6DH7-3[2] 6DH7-2[3]	35	35	3.0	3.0	External	1	1
ZL 440	VM-36	260	Q-5 (480) Q-3 (480)[2]	6DH7-3	6DH7-3	40	40	3.0	3.0	External	1	1
ZL 500 **ZR 500**	VM-38	350	Q-2 (480) P-6 (480)[2] P-5 (480)[3]	6DH41-3	6DH41-2[2]	35	40[2] 45[3]	2.5	2.5	External	1	1 1/2[2] 1[3]
ZL 600 **ZR 600**	TM-38	350	Q-2 (Fixed)	9EGY1-57-4	9DH2-4[2] 9DH2-3[3]	35	40[2] 45[3]	3.0	3.0	External	2	2 1/2[2] 3[3]
Bearcat Wide Track	VM-38	340	P-2 (480) P-0 (480)[2]	6DH8-3	6DH8-2[2]	40	40	3.0	3.0	External	1	1
Panther 550 **ZL 550**	VM-38	330	P-2 (480) P-0 (480)[2]	6DH8-3	6DH8-22	40	40	3.0	3.0	External	1	1
Triple Touring 600 **ZRT 600**	VM-36	360	P-2 (480) O-8 (480)[2] O-6 (480)[3]	6DH8-3	6DH8-2[3]	40	45[2]	2.0	2.0	External	1 1/2	1/2
ZRT 800	TM-38	350	Q-0 (Fixed)	9DFH1-56-3	9DFH2-58-3[2] 9DFH2-59-3[3]	35	45[3]	3.5	3.5	External	1 1/2	1 3/4[2] 1 1/2[3]
Pantera 1000 **Thundercat**	TM-38	320	Q-0 (Fixed)	9DFH3-56-3	9DFH2-58-32 9DFH2-59-3[3]	35	35	3.0	3.0	External	2	1 3/4[2] 2 1/4[3]
ZL 700 **ZR 700**	TM-40	320	Q-4 (Fixed)	9DH5-61-3	9EH7-62-3[2] 9EH7-62-2[3]	40	40	2.0	2.0	External	1 1/2	2 1/2
Powder Special 700 (w/Altitude Compensator)	TM-40	330	Q-2 (Fixed)	9EH6-59-4	9EH6-59-4	40	40	2.0	2.0	External	2 1/2	2 1/2
Powder Special 600 (w/Altitude Compensator)	TM-38	390	Q-2 (Fixed)	9EGJ1-57-3	9EGJ1-57-3	40	40	3.0	3.0	External	2 1/4	2 1/4
Thundercat M/C*	TM-38	320 260[2]	Q-0 (Fixed)	9DFH3-56-3	9DFH2-58-3[2] 9DFH2-59-3[3]	35	35	3.0	3.0	External	2	1 /4[2] 3 2 1/4[3]

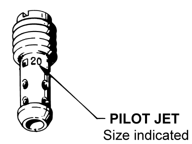
1 Refer to Main Jet Chart Decal
2 Elevations over 1524 m (5000 ft) above sea level
3 Elevations over 2743 m (9000 ft) above sea level
* Initially set up at the factory for operation between 5000-9000 feet

MODEL	TYPE	MAIN JET	MAIN AIR JET	PILOT OUTLET	PILOT JET	THROTTLE VALVE	PILOT SCREW (TURNS OUT)
Kitty Cat	BV-18	72.5	1.0	1.0	40	100	1
Z 120	BV-18	72.5	1.5	1.0	37.5	130	1 1/4

MIKUNI TUNING COMPONENTS

MAIN JETS AVAILABLE			
JET	**P/N**	**JET**	**P/N**
120	6505-270	390	6505-078
130	6505-216	400	6505-124
140	6505-217	410	6505-212
150	6505-168	420	6505-125
160	6505-064	430	6505-146
170	6505-065	440	6505-126
180	6505-056	450	6505-147
190	6505-066	460	6505-127
200	6505-144	470	6505-148
210	6505-145	480	6505-149
220	6505-137	490	6505-150
230	6505-067	500	6505-151
240	6505-079	520	6505-530
250	6505-068	530	6505-170
260	6505-017	540	6505-531
270	6505-069	560	6505-172
280	6505-080	580	6505-211
290	6505-123	590	6505-173
300	6505-128	600	6505-532
310	6505-136	620	6505-174
320	6505-074	640	6505-533
330	6505-070	650	6505-534
340	6505-076	660	6505-535
350	6505-071	680	6505-169
360	6505-038	700	6505-536
370	6505-072	710	6505-537
380	6505-077	720	6505-538



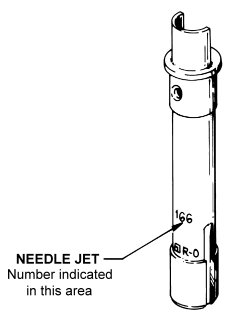


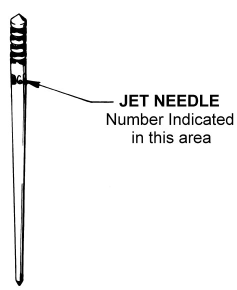
NEEDLE JETS AVAILABLE (VM-Style)			
NEEDLE JET	**P/N**	**NEEDLE JET**	**P/N**
O-6 (480)	6505-931	Q-2 (480)	6505-641
O-8 (182)	6505-181	Q-3 (480)	6505-599
O-8 (480)	6505-824	Q-4 (166)	6505-214
P-0 (159)	6505-155	Q-4 (480)	6505-636
P-0 (166)	6505-007	Q-5 (159)	6505-119
P-0 (169)	6505-051	Q-5 (166)	6505-520
P-0 (480)	6505-598	Q-5 (480)	6505-580
P-2 (480)	6505-600	Q-6 (166)	6505-506
P-4 (159)	6505-221	Q-8 (480)	6506-112
P-4 (166)	6505-502	R-0 (166)	6505-505
P-4 (480)	6505-540	Z-4 (224)	6505-808
P-4 (169)	6505-164	Z-5 (224)	6505-541
P-5 (480)	6505-542	Z-6 (224)	6505-597
P-6 (159)	6505-247	Z-8 (224)	6505-572
P-6 (166)	6505-268	Z-9 (224)	6505-618
P-6 (480)	6505-539	AA-0 (224)	6505-544
P-6 (251)	6505-235	AA-1 (224)	6505-609
P-8 (159)	6505-298	AA-2 (224)	6505-545
P-8 (166)	6505-433	AA-3 (224)	6505-604
P-8 (480)	6505-543	AA-4 (224)	6505-605
Q-0 (159)	6505-260	AA-5 (224)	6505-099
Q-0 (166)	6505-190	AA-8 (224)	6505-571
Q-0 (480)	6505-529	BB-0 (224)	6505-182
Q-2 (166)	6505-508	BB-5 (224)	6505-180

PISTON VALVES AVAILABLE (VM-Style)		
SLIDE	**CARBURETOR SIZE (mm)**	**P/N**
2.0	28-30	6505-048
3.0	28-30	6505-161
3.0	30	6505-510
3.5	30	6505-528
1.5	32-34	6505-256
2.5	32-34	6505-246
3.0	32-34	6505-439
3.5	32-34	6505-248
2.5	34	6505-500
2.5	34	6505-614*
3.0	34	6505-507
3.0	34	6505-561*
2.0	36	6505-177
3.0	36	6505-592*
2.5	38	6505-254
3.0	38	6506-643
3.5	38	6505-436
3.5	38	6505-525
3.5	38	6505-526
3.5	38	6505-554
3.5	38	6505-613*
4.0	38	6505-504
3.5	40	6505-575*
1.0	40-44	6505-092
2.0	40-44	6505-179
2.5	40-44	6505-570
3.5	40-44	6505-548

PISTON VALVES AVAILABLE (TM-Style)		
SLIDE	**CARBURETOR SIZE (mm)**	**P/N**
2.0	38	6506-119
3.0	38	6506-120
3.5	38	6506-210

* For models with carburetor switch.



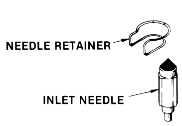


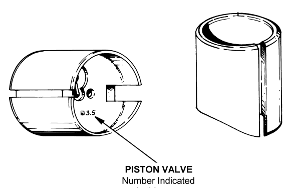
JET NEEDLES AVAILABLE			
JET NEEDLE (VM-Style)	**P/N**	**JET NEEDLE (TM-Style)**	**P/N**
6CH3	6505-519	9CFH1	6506-116
6DH2	6505-252	9DH2	6506-110
6DH3	6505-509	9DH5	6506-114
6DH4	6505-003	9DEH1	6506-118
6DH7	6505-215	9DEH2	6506-115
6DH8	6505-236	9EGY1	6506-192
7DJ2	6505-549	9EHO9	6506-173
7DH2	6505-097	9EH2	6506-111
7DH5	6505-641	9EH6	6506-117
		9EH7	6506-113
		9DFH1	6506-221
		9DFH2-58	6506-200
		9DFH2-59	6506-201
		9DFH3	6506-186

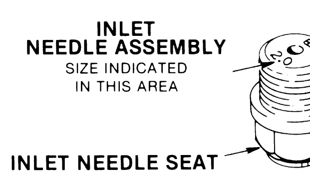
INLET NEEDLE ASSEMBLIES AVAILABLE (VM-Style)		
SEAT DIA.	**CARB. SIZE (mm)**	**P/N**
1.5 mm (Steel)	28, 30, 32, 34	6505-026
1.5 mm (Viton)	28, 30, 32, 34	6505-160
1.5 mm (Steel)	28 — 34 GVM	6505-245
1.5 mm (Steel)	36, 38, 40, 44	6505-103
1.5 mm (Viton)	36, 38, 40, 44	6505-171
1.8 mm (Viton)	36, 38, 40, 44	6505-175
2.0 mm (Viton)	36, 38, 40, 44	6505-176

INLET NEEDLE ASSEMBLIES AVAILABLE (TM-Style)		
SEAT DIA.	**CARB. SIZE (MM)**	**P/N**
1.5 mm (Steel)	38	6506-121
1.8 mm (Steel)	40	6506-144

PILOT JETS AVAILABLE			
JET NO.	**P/N**	**JET NO.**	**P/N**
17.5	6505-218	35	6505-029
20	6505-138	40	6505-047
22.5	6505-310	45	6505-278
25	6505-075	50	6505-262
27.5	6505-503	52.5	6505-261
30	6505-073	55	6505-255







MAJOR TUNING COMPONENTS

To assist you in selecting four major tuning components of the VM-style and TM-style carburetors, we have listed the jet needles, needle jets, pilot jets, and piston/throttle valves (slides) on charts below according to their size.

NEEDLE JETS	TYPE-159-166-480 VM30-32-34-38	TYPE 224 VM40-44
Lean	N-4	
	N-6	
	N-8	
	O-0	
	O-2	
	O-4	
	O-5	
	O-6	
	O-7	
	O-8	
	P-0	
	P-2	
	P-4	
	P-5	
	P-6	
	P-8	
	Q-0	Z-0
	Q-2	Z-5
	Q-3	Z-6
	Q-4	Z-8
	Q-5	AA-0
	Q-6	AA-1
	Q-8	AA-2
	R-0	AA-3
	R-2	AA-5
	R-4	AA-8
	R-5	BB-0
	R-6	BB-5
Rich	R-8	

■ NOTE: The above needle jets may come in different types; for example, (159) - (166) - (480) - (224). When selecting a new needle jet, use the correct series or type.

PILOT JETS	
Lean	12.5
	15
	17.5
	20
	22.5
	25
	27.5
	30
	32.5
	35
	37.5
	40
	45
	50
	55
	60
	65
Rich	70

PISTON/THROTTLE VALVES (SLIDES)	
Lean	**4.0**
	3.5
	3.0
	2.5
	2.0
	1.5
Rich	**1.0**

JET NEEDLES (VM-Style)		
Lean	6DH2	7F7
	6DH3	7DH2
	6DH4	7F6
	6DH7	7DH3
	6DH8	7DH5
	6DH41	7H2
Rich	6EGJ1	7J2

■ NOTE: The above chart shows the average performance of a given needle between 1/4 and 3/4 throttle. Needles are constructed in such a way that at any given point, the needle could be richer or leaner than the rating it has.

Troubleshooting Fuel System (Carbureted)

Problem: Carburetor Too Rich (0-1/4 Opening)	
Condition	**Remedy**
1. **Choke plunger** will not seat	1. Adjust—service—replace choke cable—plunger assembly
2. **Pilot air screw (VM-style)** too far in	2. Adjust pilot air screw
3. **Fuel mixture screw (TM-style)** too far out	3. Adjust fuel mixture screw
4. **Pilot air passage** obstructed—damaged	4. Remove obstruction—replace pilot air screw—carburetor
5. **Float/inlet needle** obstructed—damaged—adjusted incorrectly	5. Remove obstruction—replace inlet needle—float—adjust float tab
6. **Pilot jet** loose	6. Tighten pilot jet

Problem: Carburetor Too Rich (1/4-3/4 Opening)	
Condition	**Remedy**
1. **Pilot air screw (VM-style)** too far in	1. Adjust pilot air screw
2. **Fuel micture screw (TM-style)** too far out	2. Adjust fuel mixture screw
3. **Needle jet—jet needle** worn—adjusted incorrectly—incorrect	3. Replace—adjust needle jet—replace jet needle
4. **Pilot air passage** obstructed—damaged	4. Remove obstruction—replace pilot air screw—carburetor
5. **Pilot jet** loose	5. Tighten pilot jet
6. **Float/inlet needle** obstructed—damaged—adjusted incorrectly	6. Remove obstruction—replace inlet needle—float—adjust float tab
7. **Main jet** loose—too large	7. Tighten—replace main jet
8. **Primary air passage** obstructed	8. Remove obstruction

Problem: Carburetor Too Rich (3/4-WOT Opening)	
Condition	**Remedy**
1. **Main jet** loose—too large	1. Tighten—replace with smaller main jet
2. **Float/inlet needle** obstructed—damaged—adjusted incorrectly	2. Remove obstruction—replace inlet needle—float—adjust float tab
3. **Needle jet—jet needle** worn—adjusted incorrectly—incorrect	3. Replace—adjust needle jet—replace jet needle

Problem: Carburetor Too Lean (0-1/4 Opening)	
Condition	**Remedy**
1. **Choke plunger** remains seated	1. Adjust—service choke cable—plunger assembly
2. **Pilot air screw (VM-stlye)** too far out—damaged	2. Adjust—replace pilot air screw
3. **Fuel mixture screw (TM-style)** too far in—damaged	3. Adjust—replace fuel mixture screw
4. **Throttle valve** sticks open—damaged—worn	4. Service—replace throttle valve—throttle cable—spring
5. **Pilot jet—outlet** obstructed	5. Remove obstruction
6. **Float/inlet needle** obstructed—damaged—adjusted incorrectly	6. Remove obstruction—replace inlet needle—float—adjust float tab
7. **Float bowl vent hose (TM-style)** obstructed—kinked—damaged	7. Service—replace float bowl vent hose

Problem: Carburetor Too Lean (1/4-3/4 Opening)	
Condition	**Remedy**
1. **Pilot air screw (VM-style)** too far out—damaged	1. Adjust—replace pilot air screw
2. **Fuel mixture screw (TM-style)** too far in—damaged	2. Adjust—replace fuel mixture screw
3. **Needle jet** obstructed	3. Remove obstruction
4. **Pilot jet—outlet—main jet** obstructed	4. Remove obstruction
5. **Float/inlet needle** obstructed—damaged—adjusted incorrectly	5. Remove obstruction—replace inlet needle—float—adjust float tab
6. **Jet needle E-clip position** incorrect	6. Adjust E-clip
7. **Float bowl vent hose (TM-style)** obstructed—kinked—damaged	7. Service—replace float bowl vent hose

Problem: Carburetor Too Lean (3/4-WOT Opening)	
Condition	**Remedy**
1. **Main jet** obstructed—too small	1. Remove obstruction—replace with larger main jet
2. **Float/inlet needle** obstructed—damaged—adjusted incorrectly	2. Remove obstruction—replace inlet needle—float—adjust float tab
3. **Needle jet—jet needle** obstructed	3. Remove obstruction
4. **Float bowl vent hose (TM-style)** obstructed—kinked—damaged	4. Service—replace float bowl vent hose

Problem: General Fuel System (Engine Cuts Out at High RPM)	
Condition	**Remedy**
1. **Fuel delivery** inadequate	1. Repair—replace fuel pump—impulse hose
2. **In-line fuel filter** obstructed—damaged	2. Remove obstruction—replace in-line fuel filter
3. **Gasoline** contaminated	3. Replace gasoline—de-ice—clean carburetors
4. **Gas-tank vent—hose** obstructed	4. Remove obstruction—replace vent—hose

Problem: General Fuel System (One Cylinder Runs Lean)	
Condition	**Remedy**
1. **Carburetor-to-cylinder** air leak	1. Repair—replace gaskets—flanges—service intake ports—tighten clamps
2. **Carburetors (VM-style)** not aligned vertically	2. Align carburetors vertically
3. **Primary compression (crankcase)** low	3. Troubleshoot engine
4. **Carburetors** not synchronized	4. Synchronize carburetors

Fuel System (Batteryless EFI)

For 2000, all EFI models will be equipped with the batteryless EFI system.

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Introduction

The batteryless EFI system is lightweight in design and is made up of a number of components which are explained in this sub-section. The batteryless EFI system eliminates the worry of battery maintenance or changing main jets to compensate for altitude or temperature. This EFI system will provide quick and easy starting under all conditions.

The electrical control unit (ECU) has a self-diagnostic mode built in. It is a very valuable factor in troubleshooting. Once the problem area has been determined from the trouble code flashed by the LED (light emitting diode) located under the left end of the ECU, follow the troubleshooting procedure in this sub-section.

When troubleshooting the batteryless EFI system, special tools are required. These special tools are the following.

A. EFI Analyzer (p/n 0644-212)

B. Fuel Pressure Tester (p/n 0644-203)

C. Fluke Model 73 Multimeter (p/n 0644-191)

D. Peak Voltmeter (p/n 0644-300)

If the EFI analyzer at your dealership was purchased before February 1, 1998, it must be updated with an Update Kit (p/n 0644-256) before it can be used to troubleshoot any of the 1997-2000 batteryless EFI models. The update kit consists of a wiring harness and a new EPROM chip. The update kit can be ordered from your distributor or the Arctic Cat Parts Department.

Fig. 4-97



AE131

Fig. 4-98



AE124

4

Fig. 4-99



AE114

Fig. 4-100



AE141D

Arctic Cat Batteryless EFI System

The Arctic Cat Batteryless EFI System operates off a series of coils located on the stator.

The batteryless EFI system is made up of the following components.

1. Low and high speed coils which are located on the stator provide AC voltage to operate the CDI unit. The CDI unit is located within the ECU. The AC voltage is converted to DC voltage within the ECU.

2. A fuel pump coil located on the stator operates the low voltage, high output fuel pump. At cranking speed, the high output fuel pump provides enough fuel to charge the fuel rail.

3. An injector coil located on the stator provides the injectors with DC voltage for operation through the ECU.

4. A lighting coil located on the stator plate provides 175 watt output to operate accessories and the lighting system.

5. An electrical control unit (ECU) consisting of a circuit board and EPROM chip calculates input from five sensors (intake air temperature sensor, water temperature sensor, throttle position sensor, crankshaft positioning sensor, barometric pressure sensor) to provide the engine with the correct fuel mixture and timing for optimum operation.

EFI FEATURES

1. Automatic compensation for temperature.

2. Automatic compensation for altitude.

3. Optimum throttle response through high pressure injection.

4. Quick starting in every condition.

5. Improved fuel efficiency with maximum mileage in every condition.

6. Engine RPM more stable in every condition.

PRECAUTIONS

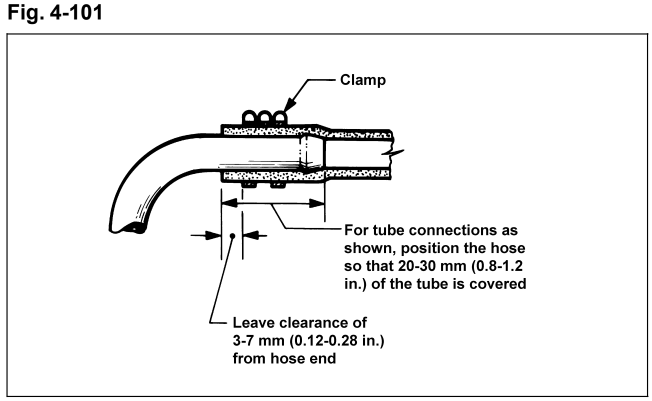
⚠ WARNING

Whenever working on the fuel system if a fuel hose is removed from any component, slowly bleed the pressure from the hose into an absorbent towel before removing the hose from the component.

⚠ WARNING

Always tighten fuel hose clamps securely.

Fig. 4-101



0729-325

⚠ CAUTION

Always use resistor-type spark plugs and spark plug caps. Non-resistor components will cause the ECU to malfunction.

STARTING

1. To start an engine for the first time or after performing service work on the fuel system, place the emergency stop switch and the ignition switch in the ON position. Disconnect the yellow water temperature sensor lead wire at the ECU. Crank the engine over 6-8 times with the recoil starter. With the water tempeature sensor lead disconnected, the fuel system will call for maximum mixture and the system will charge faster. After 6-8 brisk pulls on the recoil starter, reconnect the yellow sensor lead. The engine should start in 2-3 additional pulls. After charging the fuel system, the engine should start in 3-4 pulls when cold.

2. Start the engine without compressing the throttle. When the engine starts for the first time, do not touch the throttle. It will idle slowly and may stop. Repeat this procedure until the engine starts and builds RPM on its own. This may require 3-4 restarts. Once the engine has been started and run, the next cold start should occur in 2-3 pulls of the recoil starter.

FLOODED ENGINE

If the engine should become flooded, set the brake lever lock, compress the throttle lever to the full-open position, and crank the engine over until it starts and clears itself. Release the brake lever lock.

FUEL SYSTEM

The EFI fuel system consists of the following components.

1. Gas tank
2. Electric high output fuel pump
3. Two pick-up valves with micron screens
4. High-pressure fuel hose
5. Fuel rail
6. Fuel pressure regulator
7. Throttle body assembly
8. Injectors
9. Fuel return hose
10. ECU

These above components are grouped into the fuel handling system. They work together along with five electrical sensors (listed below) and the ECU to provide the engine with a precise fuel mixture for combustion. The five sensors are the following.

1. Crankshaft Positioning Sensor
2. Intake Air Temperature Sensor
3. Water Temperature Sensor
4. Throttle Position Sensor
5. Barometric Pressure Sensor

The fuel is first drawn into the electric fuel pump through two pick-up valves and hoses. The fuel is then routed through a high-pressure fuel hose to the fuel rail.

The fuel pressure is maintained at 37.9 ± 2.2 psi in the fuel rail by the fuel regulator. If pressure exceeds this amount, the regulator opens and returns excess fuel to the gas tank through the fuel return hose.

With the fuel pressure maintained at a constant 37.9 ± 2.2 psi, the ECU evaluates the information it receives from the five electrical sensors and opens the injectors for precise periods of time (pulse widths) to meet engine demands.

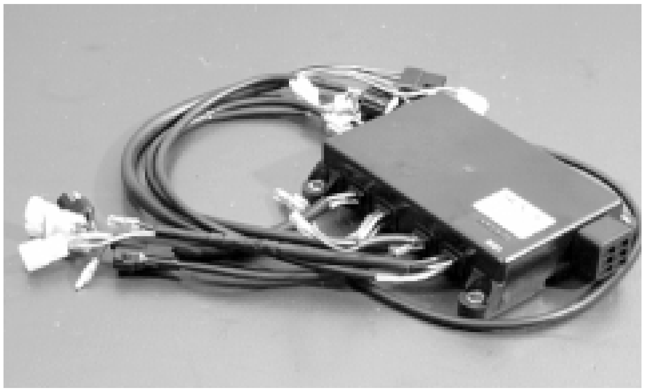
■ **NOTE: The entire EFI system depends on all coils functioning properly on the stator.**

Individual EFI Components

ECU

The ECU is the brain of the EFI system. It uses five sensor inputs to determine the correct fuel/air ratio for the engine given the existing conditions of altitude and temperature.

Fig. 4-102

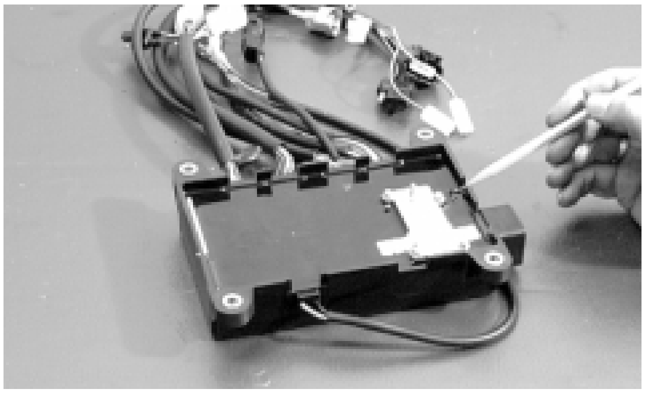


AO152D

If any of the sensors should fail while the engine is running, the ECU will sense a problem and go into a "limp home" mode. This is an over-rich condition and will greatly reduce performance. However, the engine will be protected from a possible lean condition and engine damage.

The ECU is equipped with a light emitting diode (LED), which will flash a series of pulses when a problem exists with any of the sensors. By observing the code, the technician can determine the problem sensor by comparing the code flashed with the trouble code chart (see Trouble Codes in this sub-section).

Fig. 4-103



AO153D

There are no repairs that can be made to the ECU other than replacement of the EPROM chip.

If the ECU is not receiving current from one of the output coils on the stator, that circuit will not operate. Coils on the stator are the capacitor charge coil which operates the CDI within the ECU, the injector coil which operate the injectors, the fuel pump coil which operate the fuel pump, and the lighting coil which operates all accessories and the lighting system. Refer to the wiring diagram in this sub-section.

Fig. 4-104

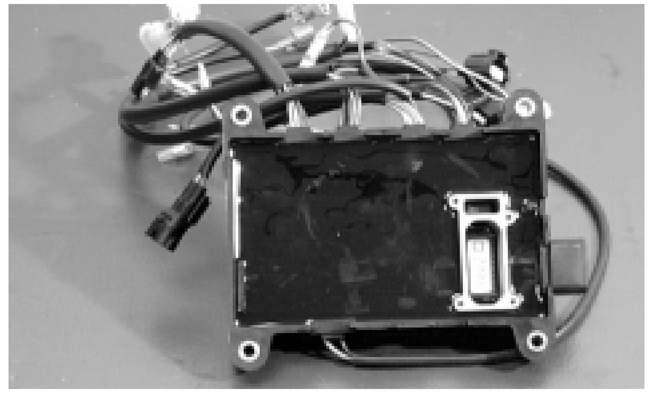


AO132D

EPROM CHIP

The EPROM chip is located inside the ECU. When replacing the chip, replace the chip with the same symbol (■—●—▲) as found on the ECU body (see EFI EPROM Chip Usage Chart in this sub-section).

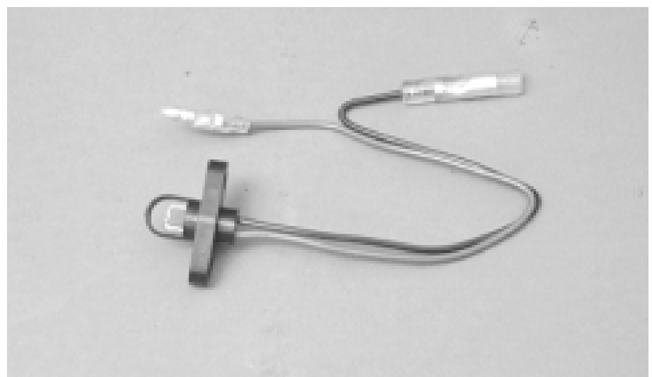
Fig. 4-105



AO154D

INTAKE AIR TEMPERATURE SENSOR

Fig. 4-106



AO135D

The intake air temperature sensor is mounted on the front of the air-intake silencer. Its purpose is to sense air temperature entering the air-intake silencer and engine. The ECU sends current to this sensor, and (depending on the temperature) the sensor will pass a certain amount of current through the sensor to ground. The ECU measures how much current passes through the sensor to ground. From this measurement, the ECU determines the air temperature and calculates the fuel/air mixture ratio. This sensor is very sensitive to temperature change. Resistance will drop as the temperature rises.

WATER TEMPERATURE SENSOR

Fig. 4-107



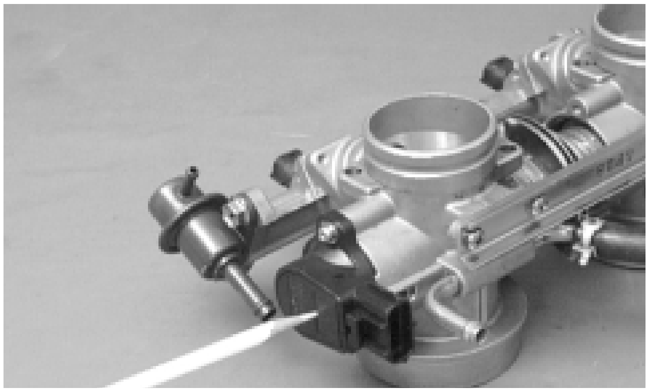
AO069

The water temperature sensor is located on the bottom of the thermostat manifold. This sensor is very sensitive to temperature change. The ECU measures the current flow through the sensor to ground. From this measurement, the ECU can determine the engine coolant temperature and calculate the correct fuel/air mixture ratio.

■ **NOTE: If the coolant temperature rises above 80°C (176°F), the temperature sensor starts to close which also will start to richen the fuel mixture. Once the engine coolant temperature reaches 93° C (200° F), the temperature sensor is fully closed which will signal the ECU to go into the rich mode to protect the engine from overheating. At this time, the overheat light will be illuminated. The overheat sensor, which illuminates the overheat light, closes at 93° C (200 ° F) ± 6° F.**

THROTTLE POSITION SENSOR

Fig. 4-108



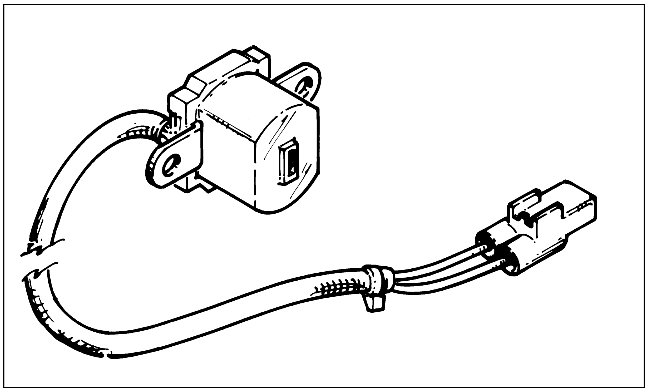
AO136D

The throttle position sensor, located at the end of the throttle shaft, is a potentiometer (a potentiometer is, essentially, a voltage divider). This sensor transforms the throttle-valve position into output voltage to the ECU. In addition, the sensor detects the opening or closing speed of the throttle valve and feeds that rate of voltage change to the ECU.

■ **NOTE: The input from the throttle position sensor is one of the main inputs for the ECU calculation of fuel/air mixture ratio.**

CRANKSHAFT POSITIONING SENSOR

Fig. 4-109



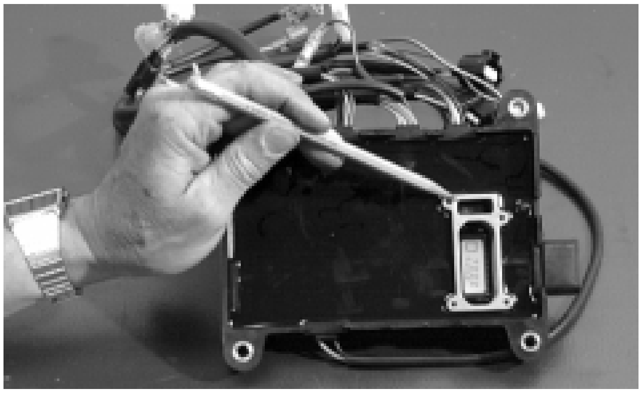
0729-627

This sensor is located on the top of the magneto case near the cylinder.

This sensor is triggered by a small metal disc precisely mounted to the flywheel flange. Each time the metal disc rotates past the sensor, a signal is sent to the ECU. From this signal, the ECU determines ignition and injection timing and RPM.

BAROMETRIC PRESSURE SENSOR

Fig. 4-110



AO155D

This sensor is located inside the ECU and is part of the ECU unit. Its purpose is to sense atmospheric pressure. From this information, the ECU determines the correct fuel/air mixture ratio.

■ **NOTE: This sensor is not replaceable. If it should fail, the ECU must be replaced.**

4

FUEL INJECTORS

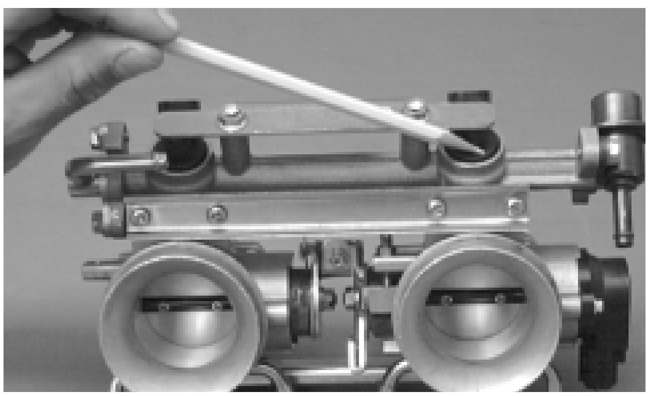
Fig. 4-111



AO139D

The fuel injectors are positioned in the top of each throttle body. O-rings seal the top and bottom of each injector, and they are held in position by a locking plate secured to the fuel rail.

Fig. 4-112



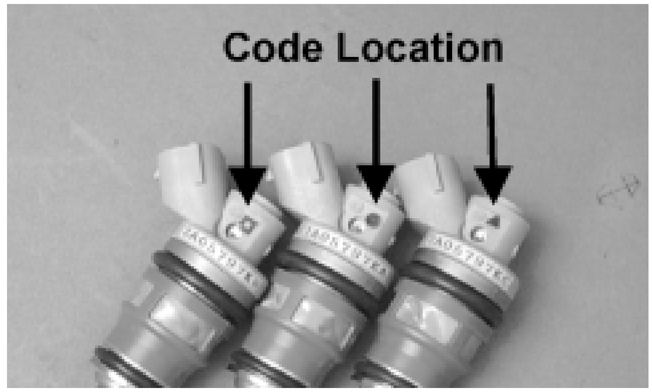
AO140D

The fuel injector is an electromagnetic injection valve controlled by a signal from the ECU. The coil used in the injector is a high-pressure resistance type. The ECU determines the optimum fuel injection time and duration based on signals from the five sensors.

When voltage is sent to the fuel injector, it energizes the coil and opens the needle valve, thereby injecting fuel. Because the fuel pressure (pressure differential between fuel line and manifold) is kept constant, the amount of fuel injected is determined by the duration of time the valve is open.

The injectors are coded with symbols (■—●—▲). When replacement of a fuel injector is necessary, the injector must be replaced with an injector of the same code symbol.

Fig. 4-113

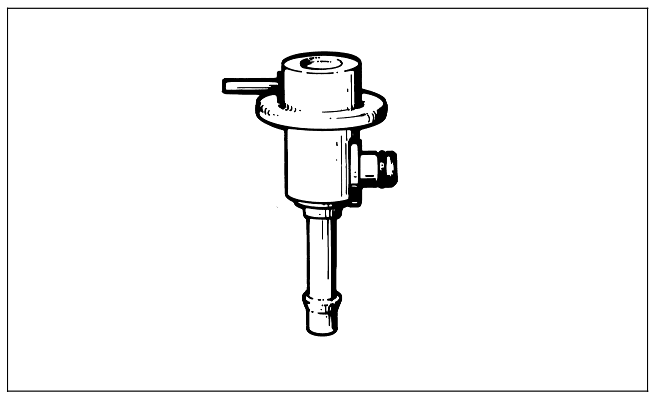


AO138DA

■ NOTE: It is very important that the correct injector is used as it has been matched with the EPROM chip used in the ECU.

FUEL PRESSURE REGULATOR

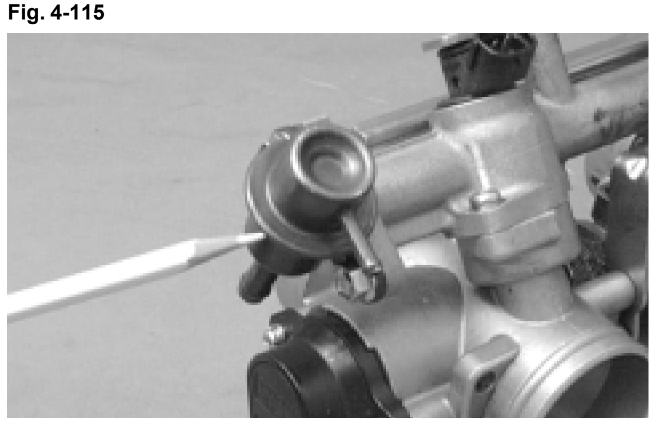
Fig. 4-114



0728-727

The fuel pressure regulator is attached to the end of the fuel rail. The fuel pressure regulator maintains the fuel pressure at a constant level of 37.9 $\pm$ 2.2 psi.

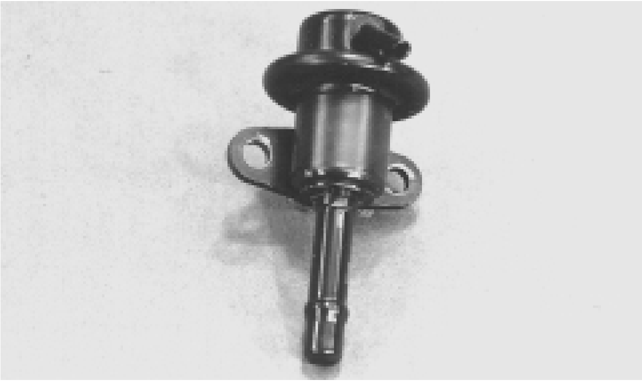
Fig. 4-115



AO141D

When fuel pressure exceeds the specification, the spring-loaded diaphragm in the regulator releases allowing fuel to flow through the return hose back to the gas tank.

Fig. 4-116



AO030

FUEL PUMP CIRCUIT

The fuel pump and its circuit are provided with current from the fuel pump coil on the stator.

Fig. 4-117



AO142D

For this circuit to function correctly, five components must be in good working order.

Check the following components before considering the fuel pump assembly to be defective.

A. Fuel pump coil - see coil test procedure.

B. Emergency stop switch and ignition switch must be ON and in good working order.

C. Fuel pump - see fuel pump test procedure.

D. Wiring harness and connectors - clean the connectors and test the harness.

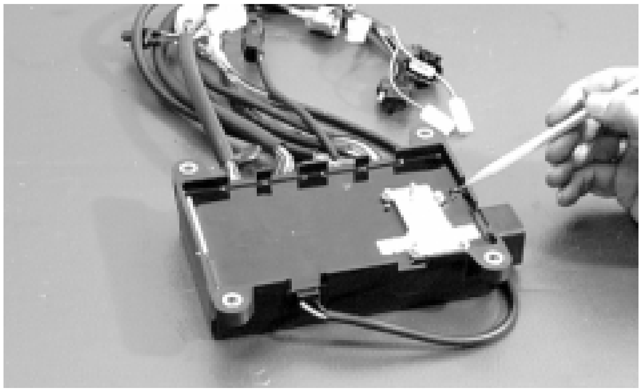
E. ECU.

Self-Diagnostic EFI System

INTRODUCTION

The Electronic Control Unit (ECU) contains a built-in, self-diagnostic system which detects trouble within the five-sensor signal network and then flashes a code on the LED signal light, located under the left end of the ECU.

Fig. 4-118



AO153D

The fuel system and the ignition system remain two separate systems. In a no-start situation, first determine if the problem is caused by lack of ignition or by a fuel delivery problem.

Using the EFI Ignition Anaylzer, equipped with the update EPROM (chip) and test harness, connect the test harness to the ECU diagnostic connectors. Connect the test harness red external lead to the positive terminal of a 12-volt battery and connect the black external test harness lead to the negative terminal.

If any of the circuits are faulty, a trouble code will now be flashed by the LED.

If no code is flashed, turn on the analyzer. Press the MENU SELECT buttons until the words KOKUSAN appear on the display; then press the TEST button. The analyzer is now programmed for testing the Arctic Cat Batteryless EFI System.

Using the MENU SELECT buttons, press the button repeatedly until Memory Problem Diagnosis Test appears on the display; then press the TEST button. If any sensors have intermittent problems, they will be indicated on the display.

Proceed to individual components test procedures covered throughout this section.

The code flashed from the LED will first be a number of flashes. Count the number of flashes and refer to Trouble Codes in this section. The code repeats itself with approximately a 2-second delay between each series of flashes.

■ **NOTE: When reading the LED flash sequence, have paper and pencil available to write down the codes being flashed. More than one code may be flashed.**

Once the problem area has been determined, check the components involved using the Fluke Model 73 Multimeter (p/n 0644-191) or the EFI Analyzer (p/n 0644-302) depending on which test is being made.

■ **NOTE: If the EFI analyzer has been updated with the new EPROM chip, select the proper EFI system being tested (ARCTCO for Battery System and KOKUSAN for Batteryless System). Press the TEST button on the analyzer and the analyzer will remain on the system selected until it is turned off. If the analyzer is turned off during the test procedure, reselect the proper system being tested before proceeding.**

Trouble Codes

Number of Flashes	Trouble
1	Open or short circuit in throttle position sensor.
2	Open or short circuit in water temperature sensor.
3	Open or short circuit in intake air temperature sensor.
4	Open or short circuit in barometric pressure sensor.
5	Failure in injector(s).

TROUBLESHOOTING INDIVIDUAL COMPONENTS

■ **NOTE: With the Arctic Cat Batteryless EFI System, it is extremely important that the ECU receives the proper current output from four coils (two capacitor charge coils, an injector coil, and a fuel pump coil) to function as designed. If a problem exists, these coils should be checked using the following procedures.**

Low/High Speed Charge Coils

The low/high speed charge coils power the CDI system and the ECU. To test these coils, disconnect the 3-wire connector from the ECU to the stator.

1. Set the meter selector to the OHMS scale and test between the black and green wires in the 3-wire connector.

2. The meter must show 46 ohms ± 20%.

3. Test between the green and brown wires in the 3-wire connector.

4. The meter must show 450 ohms ± 20%.

■ **NOTE: If either test is not within specifications, the stator must be replaced. Refer to the wiring diagram in the back of this section.**

Injector Coil Resistance Test

The injector coil located on the stator powers the two injectors.

■ **NOTE: With the engine running, there should be 12.4-12.9 DC volts at the injector leads. To test the injector coil resistance, use the following procedure.**

1. Disconnect the double-wire plug with two blue/white leads from the stator to the ECU.

2. Set the meter selector to the OHMS scale.

3. Connect a meter lead to each of the blue/white leads. The meter must show 21 ohms ± 20%.

■ **NOTE: If reading is not within the specification, recheck to confirm test results. If still out of tolerance, replace the stator.**

■ **NOTE: If the resistance test is good, a peak reading voltage test should also be made. Refer to Peak Voltage Tests and Specifications in this section.**

Fuel Pump Coil Resistance Test

The fuel pump coil powers the fuel pump through the ECU.

■ **NOTE: With the engine running, there should 12.3-12.9 DC volts supplied to the fuel pump for operation. To test fuel pump coil resistance, use the following procedure.**

1. Disconnect the double-plug with the two orange wires from the ECU.

2. Set the meter selector to the OHMS scale. Connect a meter lead to each of the two orange leads in the double plug.

3. The meter must show 1.8 ohms ± 20%.

■ **NOTE: If reading is out of tolerance, recheck to confirm reading. If still out of tolerance, replace the stator.**

■ **NOTE: If the resistance test is good, a peak reading voltage test should also be made. Refer to Peak Voltage Tests and Specifications in this section.**

Lighting Coil Resistance Test

The lighting coil located on the stator provides AC power to the lighting system and accessories through a 175 watt charging system. To test the lighting coil resistance, follow this procedure.

1. Disconnect the 3-wire connector at the engine.
2. Set the meter selector to the OHMS scale.
3. Test between the two yellow leads in the 3-wire connector.
4. The meter must show 0.09 ohm ± 20%.

■ **NOTE: If reading is out of tolerance, recheck to confirm reading. If still out of tolerance, replace the stator.**

ECU

ACTIVATING ECU MEMORY

■ **NOTE: The ECU memory on the 1997- 2000 Arctic Cat Batteryless EFI system can be activated only by using the EFI Analyzer (p/n 0644-212) which has had the updated EFI Analyzer Test Harness and EPROM Update Kit (p/n 0644-256) installed.**

The ECU has a self-diagnostic mode built into the unit. It is a very valuable tool in troubleshooting. Once the problem area code has been flashed by the light emitting diode (LED) located at the end of the ECU, follow the troubleshooting procedure in this section.

The ECU also has a memory mode for determining if any of the five sensors have intermittently failed. To activate the memory system, follow these steps.

1. Connect the analyzer test harness to the ECU diagnostic connector.
2. Connect the analyzer test harness red and black leads to a 12-volt battery.
3. Turn the analyzer switch ON.
4. Press the analyzer MENU SELECT buttons repeatedly until KOKUSAN appears on the display. Once the word KOKUSAN appears on the display, press the TEST button. The analyzer is now set up to test the batteryless EFI system.
5. Press the analyzer MENU SELECT buttons repeatedly until the words Memory Problem Diagnosis Test appears on the display.

Memory Problem Diagnosis Test

6. Press the analyzer TEST button. If all sensors are good, SENSORS ALL O.K. will appear on the display. If any of the sensors have intermittently failed or are faulty, they will appear on the display. Proceed then to checking the faulty sensor individually as covered in this section.

■ **NOTE: Once problem areas have been determined, always check the component(s) for clean and tight connections.**

7. To erase the memory of the ECU, press the TEST button once again; then push the MENU SELECT buttons until Diagnosis Memory Clear appears on the display. Turn the analyzer OFF and then back ON again. Reselect KOKUSAN mode; then proceed to the Memory Problem Diagnosis Test and push the TEST button. The display should indicate SENSORS ALL O.K. which indicates the memory has been cleared.

4

REMOVING

■ **NOTE: There isn't a test for the ECU. If a problem is suspected in this unit, try another ECU. When using another ECU, it must be a 1997, 1998, 1999, and/or 2000 model with a batteryless system. The ECU may be sent to the Arctic Cat Service Department for testing. Please contact the Service Department before sending any units.**

1. Remove the screws and lock nuts securing the ECU to the mounting bracket.
2. Tip the ECU up and forward; then disconnect the leads.
3. Remove the ECU from the bracket.

■ **NOTE: If there are any questions concerning lead or harness connections, there is an batteryless EFI system wiring diagram in the back of this section.**

INSTALLING

1. Secure the ECU to the mounting bracket with the cap screws and nuts making sure the short black ground lead is secured by the inner rear cap screw.

■ **NOTE: Make sure the diagnostic connector plug faces the oil reservoir.**

2. Route all wiring harnesses under the ECU.
3. Connect the wiring harness connectors to the ECU.

4. Place the ECU mounting bracket into position and secure with cap screws and nuts.

■ **NOTE: Make sure all connectors are clean and tight. Apply dielectric grease to all connectors.**

EPROM Chip

REMOVING

■ **NOTE: Before touching the EPROM chip, use a screwdriver to discharge all static electricity from your body by grounding yourself to a good ground on the engine.**

⚠ CAUTION

Failing to discharge static electricity from your body before handling the EPROM chip may ruin the chip being removed or the new chip being installed.

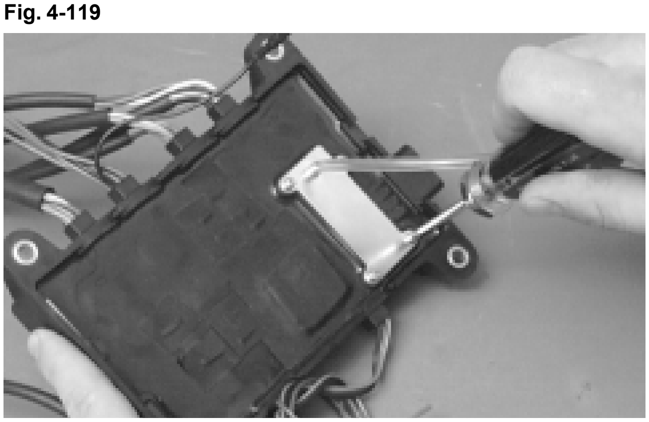
⚠ CAUTION

If the analyzer is connected to the ECU, disconnect it during EPROM chip removal and installation or damage to the ECU or EPROM chip may occur.

1. Remove the four screws securing the ECU to the mounting bracket.

2. Turn the ECU over and from the underside, remove the screws securing the small cover to the bottom of the ECU.

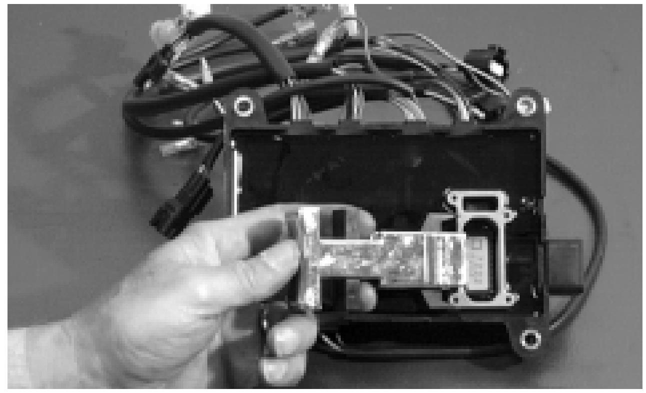
Fig. 4-119



AO134D

3. Remove the cover and gasket; then using the Chip Puller (p/n 0644-188), pull the chip straight up out of its mounting sockets.

Fig. 4-120



AO156D

INSTALLING

■ **NOTE: Before touching the EPROM chip, use a screwdriver to discharge all static electricity from your body by grounding yourself to a good engine ground.**

■ **NOTE: Both the EPROM chip and its mounting plate are notched. When installing the chip, the notched end must align with the notch in the mounting plate.**

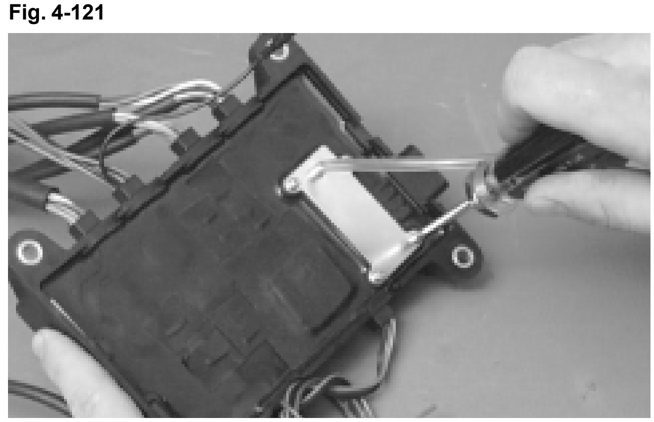
■ **NOTE: The original EPROM chip must always be used as recommended in the Illustrated Parts Manual for the EFI model being worked on.**

1. Insert the pins straight down into the mounting socket being careful to assure each pin is started into its socket.

2. Once all pins are in their sockets, press the chip down firmly.

3. Install the ECU gasket and cover; then secure with the screws.

Fig. 4-121



AO134D

4. Secure the ECU to its mounting bracket using the cap screws. Make sure the short black ground wire is secured by the rear inner cap screw.

Testing Individual Components

■ **NOTE: For the following tests, use the Fluke Model 73 Multimeter (p/n 0644-191) or a multimeter of the same quality.**

FUEL INJECTORS

Fig. 4-122

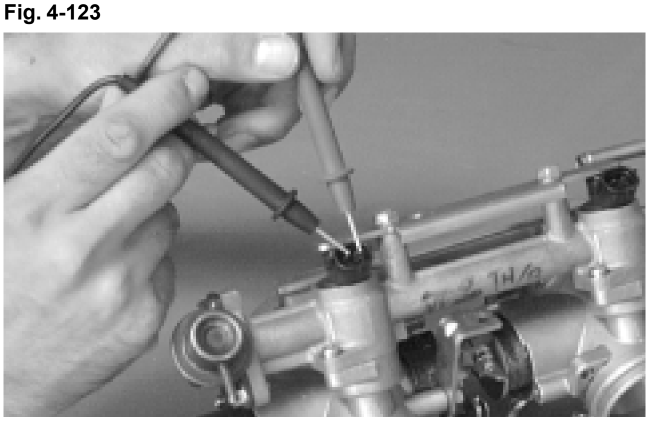


AO139D

Testing Resistance/Voltage

1. Disconnect the fuel injector wiring harness.
2. Set the meter selector to the OHMS scale.
3. Test between the two injector terminals. Test specification is 2.4 - 3.3 ohms.

Fig. 4-123



AO144D

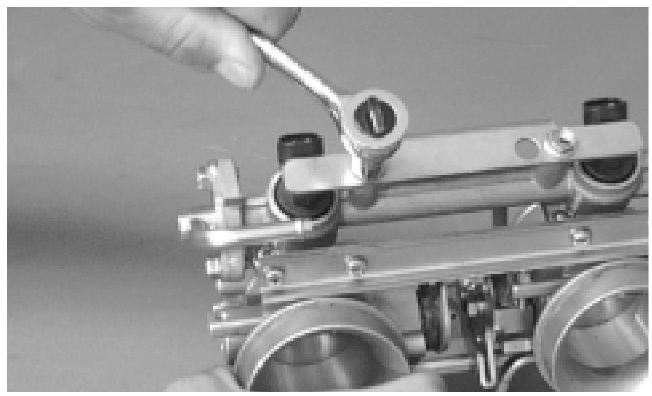
4. If not within specifications, replace the injector.

Removing

> **⚠ CAUTION**
>
> **The fuel supply hose may be under pressure. Place an absorbent towel around the connection to absorb fuel; then remove the hose slowly to release the pressure.**

1. Loosen the clamp securing the fuel supply hose to the fuel rail; then remove the hose from the fuel rail.
2. Disconnect the wiring harness from each injector.
3. Remove the two screws securing the injector hold-down plate to the throttle body assembly; then remove the plate from the injectors.

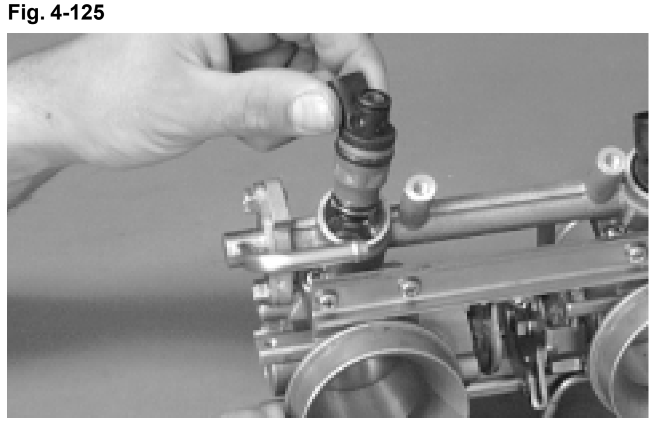
Fig. 4-124



AO145D

4. Remove the fuel injectors from the throttle body assembly.

Fig. 4-125



AO146D

Installing

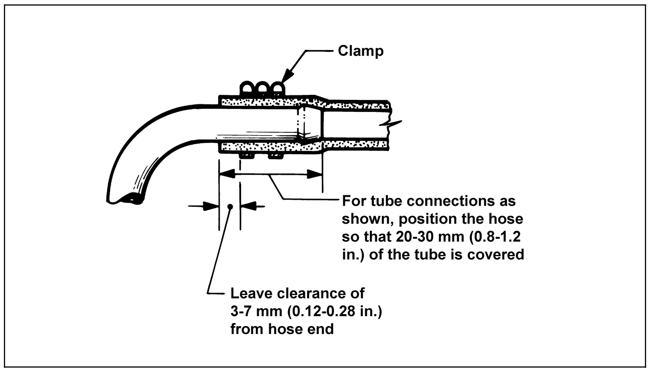
1. Apply a light coat of oil to all O-rings; then install the upper and lower O-rings onto each injector.
2. Install the injectors into the throttle body assembly.

3. Place the injector hold-down plate into position on top of the injectors and secure with two screws.

4. Connect the fuel delivery hose to the fuel rail and secure with a clamp.

■ **NOTE: When securing the fuel delivery hose, position the clamp as shown.**

Fig. 4-126

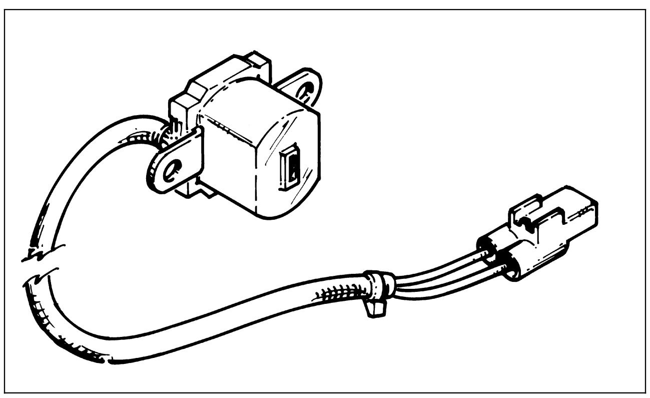


0729-325

5. Connect the wiring harness to the injectors making sure the number 1 harness is connected to the MAG-side injector.

CRANKSHAFT POSITIONING SENSOR

Fig. 4-127



0729-627

■ **NOTE: The sensor is located on the top of the magneto housing PTO-side.**

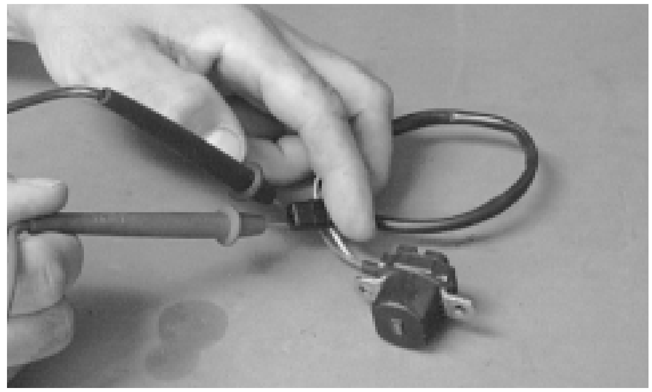
Testing Resistance

1. Disconnect the two leads from the sensor to the main wiring harness.

2. Set the meter selector to the OHMS scale.

3. Test between the green/white and brown leads from the sensor. Test specification is 80.8-121.2 ohms.

Fig. 4-128



AO147D

Removing

1. Open the rubber boot that protects the main wiring harness connections; then disconnect the ignition timing sensor from the ECU wiring harness.

2. Remove the two screws securing the sensor to the magneto housing.

3. Remove the sensor.

Installing

1. Using two screws coated with blue Loctite #242, secure the sensor to the magneto housing (inner mounting hole).

2. Connect the sensor to the ECU wiring harness; then close the rubber boot.

3. Secure loose wires with cable ties.

ELECTRIC FUEL PUMP

Fig. 4-129



AO142D

Testing

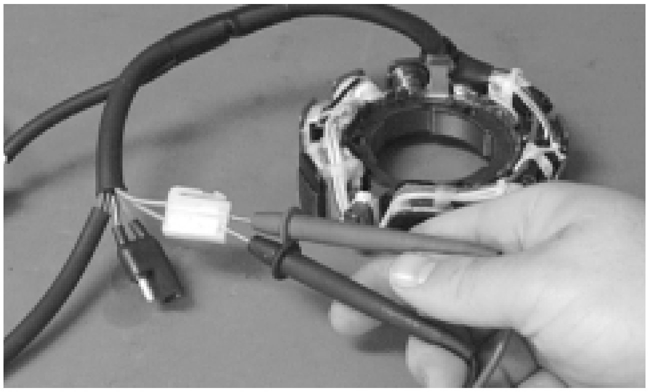
If the fuel pump fails to operate, check the following items.

1. Disconnect the two-wire connector with the two orange wires from the ECU.

2. Set the meter selector to the OHMS scale; then test between the two orange leads in the two-wire connector from the stator.

3. The meter must show 1.4-2.2 ohms.

Fig. 4-130



AO148D

■ **NOTE: If the fuel pump coil tests within specifications, proceed to test the fuel pump. If the pump coil resistance test is not within specifications, retest to confirm. If still out of tolerance, replace the stator.**

4. To test the fuel pump, remove screws securing the right side of the console; then lift console high enough to disconnect the fuel pump harness.

5. Set the meter selector to the OHMS scale; then test between the two fuel pump leads. The meter must indicate continuity.

■ **NOTE: If continuity is not indicated, replace the fuel pump. If both the fuel pump coil and fuel pump test within specifications and the fuel pump still fails to operate, replace the ECU.**

■ **NOTE: As a final test with the fuel pump removed from the fuel tank and using jumper leads, connect a 12-volt battery to the fuel pump with the positive lead to the fuel pump terminal marked + and the negative lead to the fuel pump terminal marked -. If the pump now operates, recheck the fuel pump coil for continuity. If good, replace the ECU.**

Testing Fuel Pressure

⚠ CAUTION

The fuel pump should never be operated dry for a long period of time or damage will result.

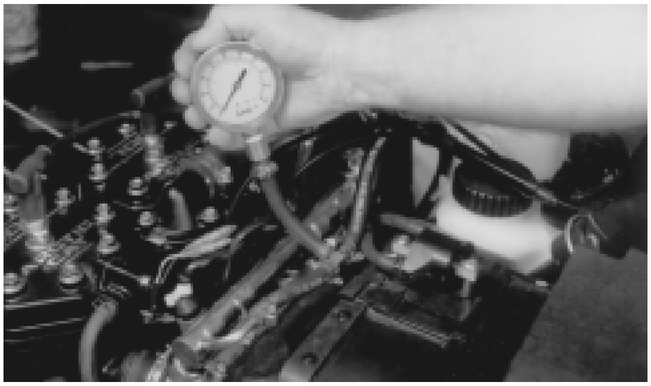
⚠ CAUTION

If the fuel pump or hose is to be removed from the system, slowly release the fuel hose pressure by loosening the inlet hose clamp and covering the connection with an absorbent towel.

■ **NOTE: Fuel pressure can be tested by installing a pressure gauge between the fuel supply hose and fuel rail.**

1. Position hose clamps back 3 mm (0.120 in.) from the end of the fuel hose and tighten clamps securely.

Fig. 4-131



AO011

2. Start the engine and observe the fuel pressure. If fuel pressure exceeds or falls below 37.9 $\pm$ 2.2 psi, the fuel pressure regulator may be defective (see Fuel Pressure Regulator in this sub-section) or the fuel return hose may be obstructed (remove obstruction).

4

Removing

1. Remove the console.

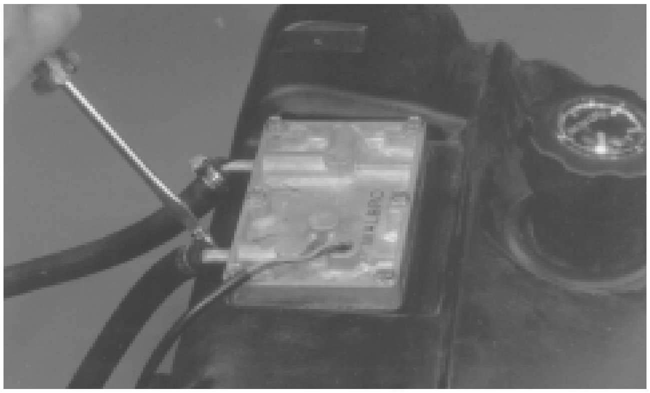
2. Disconnect the fuel pump wiring harness from the fuel pump.

3. Label the fuel hoses “supply” and “return”; then loosen the clamps and remove the fuel hoses.

⚠ WARNING

The fuel supply hose may be under pressure. Cover with an absorbent towel while removing to collect any fuel.

Fig. 4-132



AH201

4. Remove the screws and washers securing the fuel pump; then remove the fuel pump assembly. Account for a gasket.

Fig. 4-133



AH203

Installing

1. Install the gasket on the gas tank; then install the fuel pump assembly with the screens on the two fuel pick-up valves facing down. The long pick-up hose and screen must be positioned to the rear of the tank.

■ **NOTE: The screens on the two fuel pick-up valves must face down in the gas tank.**

Fig. 4-134



AH207

2. Secure the fuel pump with screws and washers. Tighten to 0.1 kg-m (12 in.-lb).

⚠ WARNING

Do not over-tighten the screws securing the fuel pump to the tank.

Fig. 4-135

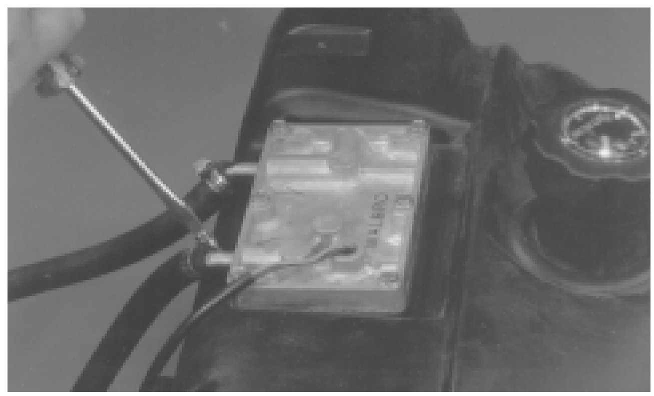


AH203

3. Connect the fuel pump wiring harness to the fuel pump.

4. Connect the fuel supply and return hoses to their respective fittings and secure with clamps.

Fig. 4-136

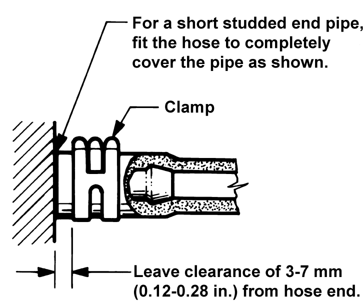


AH201

⚠ CAUTION

Check fuel hose connections to ensure they are tight and properly connected.

Fig. 4-137



0729-324

5. Place the console into position. Connect all wires to their respective switches.

6. Secure the console.

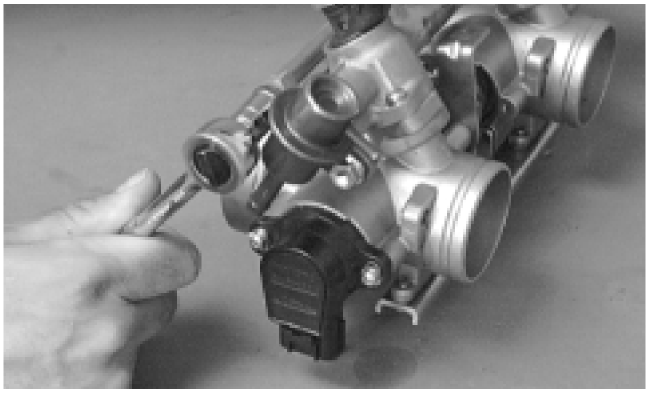
FUEL PRESSURE REGULATOR

Removing

1. Loosen the clamp securing the fuel return hose to the fuel regulator; then remove the hose.

2. Remove the two screws securing the fuel pressure regulator to the fuel rail; then slowly remove the regulator. Account for the O-ring.

Fig. 4-138



AO149D

⚠ CAUTION

Since the regulator may be under pressure, remove it slowly to release the pressure. Place an absorbent towel around the connection to absorb fuel.

Testing Fuel Pressure Regulator

1. Using the Fuel Pressure Tester (p/n 0644-203), connect the tester to the regulator fuel inlet.

Fig. 4-139



AO053

■ **NOTE: A short piece of 3/8 in. I.D. hose will be needed to make the above connections.**

2. Pressurize the regulator to 2.0-2.2 kg/cm^2 (28-31.3 psi). Turn the pressure tester shut off valve to the OFF position. Observe the gauge for several minutes and note if there is any loss of pressure. If pressure begins to drop, the cause may be a ruptured diaphragm, worn spring, or leaking valve. If the regulator fails to build or maintain pressure, replace the regulator.

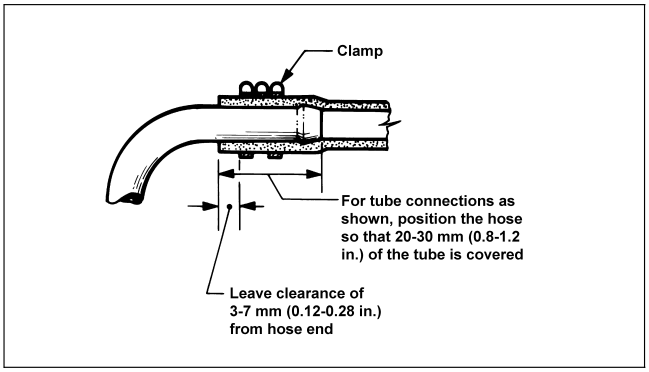
■ **NOTE: If there is a drop in pressure, check the hose connections to ensure there are no leaks.**

Installing

1. Position the O-ring on the fuel pressure regulator; then place the regulator into position on the fuel rail. Secure with two screws.

2. Connect the fuel return hose to the regulator; then secure with a clamp.

Fig. 4-140



0729-325

WATER TEMPERATURE SENSOR

Testing Resistance

■ **NOTE: The water temperature sensor is very sensitive to temperature change. Before the resistance test is conducted, it is important to know the coolant temperature. If the engine has been operated recently and the coolant is warm, the resistance will measure lower than if the coolant was at room temperature or colder. For accurate test results, check the coolant temperature in the filler neck using a thermometer.**

1. Disconnect the water temperature sensor wiring harness from the main harness.

2. Set the meter selector to the OHMS position and test the resistance between the two leads from the sensor.

3. Compare the resistance reading to the EFI Component Voltage/Resistance Chart Water Temperature in this section. If resistance is not within the specification, replace the sensor.

4

■ **NOTE: A water temperature sensor voltage test can be made using the EFI Analyzer. Please refer to the analyzer test procedures provided on the following pages.**

Removing

1. Drain the cooling system.
2. Remove the throttle body assembly.
3. Disconnect the wiring harness from the water temperature sensor.
4. Remove the sensor from the water temperature case.

Installing

1. Apply teflon tape to the threads of the water temperature sensor; then install the sensor.
2. Connect the wiring harness to the sensor.
3. Install the throttle body assembly.
4. Fill the cooling system.

INTAKE AIR TEMPERATURE SENSOR

Testing Resistance

■ **NOTE: It is very important to know the component temperature before conducting this test. Allow the engine to reach room temperature.**

1. Disconnect the wiring harness from the intake air temperature sensor.

Fig. 4-141



AO135D

2. Set the meter selector in the OHMS position and test the two leads located in the sensor connector. Compare with the EFI Component Voltage/Resistance Chart Air Temperature in this section.

■ **NOTE: The intake air temperature sensor employs a thermistor, which is very sensitive to temperature changes. Resistance will change as temperature varies.**

Removing

1. Disconnect the wiring harness from the intake air temperature sensor.
2. Using a standard screwdriver, pry the sensor end to end to remove it from the air-intake silencer. Account for two push pins.

Installing

1. Place the sensor into position in the air-intake silencer and secure with push pins.
2. Connect the wiring harness to the intake air temperature sensor. Secure the sensor leads with cable ties so they do not rub on any other components.

EFI Analyzer

GENERAL INFORMATION

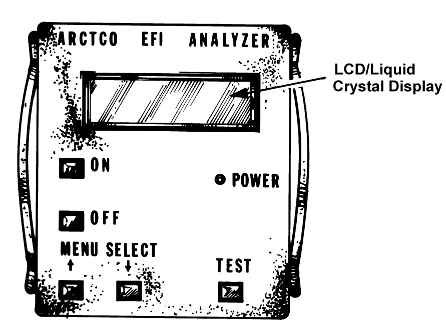
The EFI Analyzer (p/n 0644-302) makes it possible for technicians to easily perform EFI system troubleshooting in a short period of time.

Before an EFI analyzer purchased prior to February 1, 1998, can be used on the batteryless EFI system, it must be updated with the Harness and EPROM Update Kit (p/n 0644-301) available from your Arctic Cat Parts Department. All analyzers purchased after June 1, 1998, were updated at Arctic Cat.

To use the analyzer on the batteryless EFI system, a 12-volt battery to power the analyzer is necessary. Follow the instructions under Analyzer Setup for testing the batteryless EFI system.

Analyzer Nomenclature

Fig. 4-142



730-222A

1. LCD - Liquid Crystal Display.

2. Power-Light illuminates when the analyzer is properly connected to the snowmobile EFI analysis test plug.

3. On/Off Switches.

4. Menu Select (up/down) - Enables selection of a test function quickly.

5. Test - Once the test function is selected, push the button to complete the test. The button also cancels the current test so the next test function can be selected.

Analyzer Test Function (Batteryless System)

If the EFI analyzer has been updated with the 1998 Harness and EPROM chip, it can be used to troubleshoot the 1997-2000 batteryless EFI system. There is, however, special information which can be retrieved from the 2000 ECU such as total running time on engine, running times by temperature, maximum RPM by temperature, EPROM chip change check, number of fuel changes by wire disconnect, and last fuel type used. This information can only be retrieved with an EFI analyzer which has been updated with either the 1999 Harness and EPROM Chip Update Kit (p/n 0644-301) or the 1999 EFI Analyzer EPROM chip (p/n 0643-068).

If the EFI analyzer has been updated with the new EPROM chip (p/n 0643-068) when the MENU SELECT buttons are pressed, there will be three modes to select from. First mode, ARCTCO, is used to troubleshoot the battery style EFI systems used in 1998 and prior year models. The second mode, KOKUSAN, is used to troubleshoot the 1997-2000 batteryless EFI system. The third mode, KOKUSAN SPECIAL, is used only to retrieve special information (explained earlier) found only on the 2000 batteryless EFI system ECU.

At this point, select one of the modes by pushing the TEST button, or the analyzer will not continue past this point. If testing a batteryless EFI system, select KOKUSAN on the display by pushing the TEST button. The entire system can now be tested by moving to the next test using the MENU SELECT buttons.

If the analyzer is turned off during the test procedure, the test function on the display will automatically start over at the top of the list when turned back on. This means the selection of the system being tested must be repeated before continuing.

Once a test has been completed, press the TEST button again to cancel the test, which allows the selection of a different test using one of the MENU SELECT buttons.

■ **NOTE: If the new updated EPROM chip has not been installed, the EFI (Battery System) can be tested; however, without the new Test Harness and EPROM Update Kit (p/n 0644-301), the new Arctic Cat Batteryless EFI System cannot be tested. All EFI analyzers purchased after February 1, 1998, were updated at Arctic Cat.**

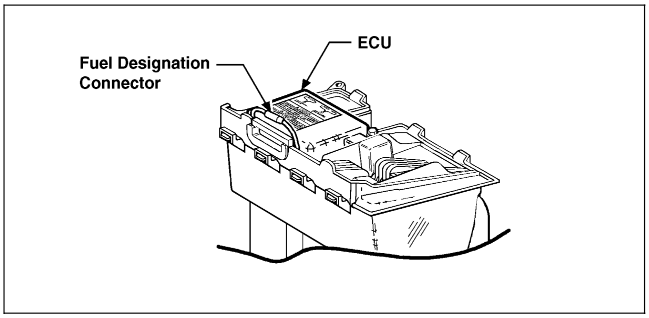
Menu List Organization (Kokusan Mode)

1. Engine RPM
2. Diagnosis memory clear
3. Memory problem diagnosis test
4. Existing problem diagnosis test
5. Barometric pressure
6. Water temperature
7. Intake air temperature
8. Throttle valve angle in degrees
9. Ignition timing

Kokusan Special Mode

The 2000 batteryless EFI system has an updated ECU. With the 2000 ECU, the snowmobile can be run with either regular gasoline or oxygenated gasoline without changing the EPROM (chip). Special instructions located on top of the tool box lid will instruct to disconnect two wires located in front of the ECU if oxygenated gasoline is used. If regular gasoline is to be used, the two wires in front of the ECU must remain connected or the mixture will be too rich.

Fig. 4-143



734-482A

Menu List Organization (Kokusan Special Mode)

1. Throttle Adjust - given in both volts and degree.

2. Fuel Change Number - number of times fuel leads have been switched between regular gasoline and oxygenated gasoline.

3. Last Gasoline Type - in case of engine failure, what the system was last set for - regular gasoline or oxygenated gasoline.

4. Other Rom Check - will indicate if the EPROM chip has been changed. If none appears on the display, the EPROM chip has not been changed since the ECU was assembled.

5. Maximum Revolutions by Temperature - provides a range in increments of 10° from -30° C to -101° C. Will show engine RPM for each temperature range and if the engine has been operated in the range.

6. Running Time by Temperature - will indicate how long the engine has been run in each tempeature range from 40° C to 101° C in increments of 10°.

7. Total Running Time - will show total hours on the engine.

8. Barometric Pressure - provides current air pressure.

To test an batteryless EFI system using the EFI Analyzer, follow all instructions carefully and completely.

Analyzer Setup

1. Before connecting the analyzer to the snowmobile, always check to make sure the analyzer is OFF; then connect the analyzer batteryless test harness (equipped with red and black external leads) to the ECU diagnosis connector.

2. Attach the red external lead to the positive terminal of a 12-volt battery; then connect the negative external lead to the negative post.

3. Press the ON button of the analyzer. At this point, the power light of the analyzer must be illuminated.

4. Push either MENU SELECT button on the analyzer until KOKUSAN mode appears on the display; then push the TEST button. The analyzer is now ready to test the batteryless EFI system.

5. To retrieve information found under Kokusan Special Mode, push Menu Select button until Kokusan Special Mode appears on the display; then push the TEST button. The analyzer is now ready to test the special areas shown on the menu list under Kokusan Special Mode.

■ **NOTE: When testing the batteryless EFI system, KOKUSAN mode must be on the display. Once the TEST button is pressed with KOKUSAN mode on the display, the analyzer will stay in this mode until it is turned OFF.**

■ **NOTE; Each time the analyzer is turned OFF, reselection of the KOKUSAN mode is necessary. The ARCTCO mode, which will also appear on the display when the MENU SELECT buttons are pressed, is for testing an EFI (battery system).**

EFI Components Not Tested by Analyzer

When troubleshooting the EFI system with the EFI Analyzer, there are EFI components the analyzer will NOT diagnose. These components, (in the following list) must be tested using a good digital volt/ohmmeter or a fuel pressure gauge using recommended procedures in this section.

1. Fuel Pump Coil - Injection Coil - Timing Sensor.

2. CDI Ignition Coil.

3. External Ignition Coil.

4. Fuel Pressure Regulator - Maintains fuel pressure at 37.9 ± 2.2 psi.

5. Electric Fuel Pump - Located in the gas tank. Supplies fuel under pressure to fuel injectors.

6. Switches and Stator Coils - Supplies all systems with current.

Recommended EFI Troubleshooting Sequence (Kokusan Mode)

When troubleshooting the batteryless EFI system, use the following troubleshooting sequence to locate problems quickly and efficiently.

EXISTING PROBLEM DIAGNOSIS TEST

This should be the first test made. In this mode, the analyzer tests the following components all at once.

A. Throttle Position Sensor

B. Intake Air Temperature Sensor

C. Water Temperature Sensor

D. Barometric Pressure Sensor

E. Fuel Injectors

After pushing the TEST button on the analyzer, the display will indicate either SENSORS ALL O.K. or which of the sensors are defective. Check these components individually using the recommended procedures in this section.

MEMORY PROBLEM DIAGNOSIS TEST

This should be the second test made. In this mode, the analyzer will reveal any problems in the sensor area which might have occurred intermittently as the snowmobile was being operated.

If there were any such intermittent problems, the problem area will be shown on the display. Check the indicated area for a wire connection problem or loose or corroded connections.

Testing Individual EFI Components

■ **NOTE: For all of the following tests using the EFI Analyzer, the analyzer power light must be illuminated. If not illuminated, the problem must be corrected before proceeding. Also, the analyzer must be properly connected to a 12-volt battery.**

ENGINE RPM FUNCTION

This test can be used to verify the snowmobile tachometer or can be used when checking several of the EFI components. When checking the RPM, use the following procedure.

1. Place the rear of the snowmobile on a safety stand.
2. Start the engine.
3. Connect the analyzer harness (analyzer OFF) to the diagnosis test plug. Connect the external leads of the harness to a good 12-volt battery.
4. Switch the analyzer ON.
5. With the analyzer power light illuminated and using an analyzer with the new updated EPROM chip, select KOKUSAN by pressing the MENU SELECT buttons until KOKUSAN appears on the display; then press the TEST button. Press the MENU SELECT buttons repeatedly until Engine RPM appears on the display.

Engine RPM

6. Press the TEST button. Actual engine RPM should now be indicated. Slowly compress the throttle lever and the display should indicate the increased engine RPM.

■ **NOTE: The test harness must be connected to the ECU after the engine has been started. If connected prior, the engine may be very difficult to start.**

■ **NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.**

IGNITION TIMING TEST FUNCTION (Engine Running)

■ **NOTE: When using an analyzer which has been updated with the new EPROM chip, first select KOKUSAN by pressing the TEST button. This will allow the testing of the batteryless EFI system.**

1. Place the rear of the snowmobile on a safety stand.
2. Start the engine.
3. Connect the analyzer harness (analyzer OFF) to the diagnosis test plug. Connect the external leads of the harness to a good 12-volt battery.
4. Switch the analyzer ON.
5. With the analyzer power light illuminated, press the MENU SELECT buttons repeatedly until the words Ignition Timing appear on the display.

Ignition Timing

6. Press the TEST button; then increase the engine RPM to the specification given. Actual engine timing in degrees will now appear on the display.

Timing Specifications		
Model	**Degrees**	**@ RPM**
500 EFI	24 ± 2	3500
580 EFI	30 ± 2	4000
600 EFI	20 ± 2	5000

■ **NOTE: The test harness must be connected to the ECU after the engine has been started. If connected prior, the engine may be very difficult to start.**

■ **NOTE: Ignition timing remains the same on either a hot or cold EFI engine. Always verify timing at 4000 RPM using a timing light. Timing is not adjustable. If timing is off by more than 2°, the problem may be either the ignition timing sensor or the CDI unit.**

■ **NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.**

EXISTING PROBLEM DIAGNOSIS TEST (ENGINE OFF) FUNCTION

■ **NOTE: When using an analyzer which has been updated with the new EPROM chip, first select KOKUSAN by pressing the TEST button. This will allow the testing of the batteryless EFI system.**

1. With the analyzer OFF, connect its harness to the diagnosis test plug. Connect the external leads of the harness to a good 12-volt battery.

2. Switch the analyzer ON.

3. With analyzer power light illuminated, press the MENU SELECT buttons repeatedly until the words Existing Problem Diagnosis Test appear on the display.

Existing Problem Diagnosis TEST

4. Press the TEST button. If all sensors are good, SENSORS ALL O.K. will appear on the display. If any of the sensors listed under Existing Problem Diagnosis Test are defective, that sensor will be indicated on the display. Proceed then to check the defective sensor individually as covered in this section.

■ **NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.**

MEMORY PROBLEM DIAGNOSIS TEST (ENGINE OFF) FUNCTION

■ **NOTE: When using an analyzer which has been updated with the new EPROM chip, first select KOKUSAN by pressing the TEST button. This will allow the testing of the batteryless EFI system.**

1. With the analyzer OFF, connect its wiring harness to the diagnosis test plug. Connect the external leads of the harness to a good 12-volt battery.

2. Switch the analyzer ON.

3. With both indicator lights illuminated, press the MENU SELECT buttons repeatedly until Memory Problem Diagnosis Test appears on the display.

Memory Problem Diagnosis TEST

4. Press the analyzer TEST button. If there has been an intermittent problem in a sensor, that sensor will be indicated on the display. Make necessary repairs.

■ **NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.**

CLEARING MEMORY

1. With the analyzer harness attached to the diagnosis test plug, press the MENU SELECT buttons until the words Diagnosis Memory Clear appear on the display.

Diagnosis Memory Clear

2. Press the analyzer TEST button and the words Please Key Off should appear on the LCD; then turn the analyzer switch to the OFF position. Immediately turn the analyzer switch to the ON position and the memory should now be clear.

Please Key Off

■ **NOTE: To check if the memory is clear, perform Memory Problem Diagnosis Test to see if all sensors test good. If a problem still remains on memory, repeat Clearing Memory procedure.**

THROTTLE VALVE ANGLE TEST (DEGREES/VOLTS) FUNCTION

The correct throttle valve angle is extremely important for proper engine operation. If the throttle valve angle isn't correct in the idle position, the engine may be very difficult to start "cold." If the throttle valve angle isn't correct in any of the off-idle positions, engine damage or poor performance may result because of an incorrect mixture.

■ **NOTE: When using an analyzer which has been updated with the new EPROM chip, first select KOKUSAN by pressing the TEST button. This will allow the testing of the batteryless EFI system.**

1. Connect the analyzer harness to the diagnosis test plug. Make sure the analyzer is OFF.

2. Switch the analyzer ON.

3. With the analyzer power light illuminated, press the MENU SELECT buttons on the analyzer repeatedly until the words Throttle Valve Angle appear on the display.

Throttle Valve Angle

■ **NOTE: When performing the Throttle Valve Angle Test, test both the idle and full-open throttle positions. Specifications are given for both positions in degrees and volts.**

4. With the throttle in the "idle" position (engine not running), press the analyzer TEST button. The throttle valve angle should now appear on the display.

Throttle Valve Angle - Degrees		
Model	**Idle**	**Full-Open (Volts)**
500 EFI	3.715° - 4.065°	77.265° - 86.135°
580 EFI	7.85° - 8.00°	75.37° - 86.135°
600 EFI	3.715° - 4.065°	77.265° - 86.135°

Throttle Valve Angle - Voltage			
Model	**Idle (Volts)**	**Full-Open (Volts)**	**Full-Closed (Volts)**
500 EFI	0.625 - 0.647	3.575 - 3.937	0.404
580 EFI	0.780	3.575 - 3.937	0.544
600 EFI	0.625 - 0.647	3.575 - 3.937	0.404

5. If the "idle" position throttle valve angle or voltage isn't within test specifications, push down on the throttle shaft to make sure it is fully closed. If the test specifications are now within tolerance, loosen the throttle cable.

6. If the "idle" position throttle valve angle test specification remains out of tolerance, adjust the idle speed screw. If the throttle valve angle cannot be corrected by either an idle speed screw or cable adjustment, replace the throttle body assembly.

7. Compress the throttle lever to the "full-open" position (engine not running). The test specification must be within the tolerance shown in chart. If the test specification is out of tolerance, grasp the throttle cable next to the throttle shaft and pull on the cable. If the test specification is now within tolerance, adjust the throttle cable. If the throttle valve angle remains out of tolerance, replace the throttle body assembly.

8. If the specifications listed below ARE DISPLAYED during the test, replace the throttle body assembly.

Throttle Valve Angle - Degrees/Volts	
Degrees/Volts	**RPM Range**
2.25/0.570	Idle to 3000

■ **NOTE: If the Throttle Position Sensor should fail, the ECU will go into the "limp home" mode and the above readings in the idle position will be displayed.**

■ **NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.**

INTAKE AIR TEMPERATURE SENSOR (ENGINE OFF) FUNCTION

■ **NOTE: When using an analyzer which has been updated with the new EPROM chip, first select Kokusan by pressing the TEST button. This will allow the testing of batteryless EFI system.**

1. With the analyzer OFF, connect its harness to the diagnosis test plug. Connect the external leads of the harness to a good 12-volt battery.

2. Switch the analyzer ON.

3. With the analyzer power light illuminated, press the MENU SELECT buttons repeatedly until Intake Air Temperature appears on the display.

Intake Air Temperature

4. Press the analyzer TEST button and the intake air temperature will be indicated on the display.

■ **NOTE: Intake air temperature will be displayed in both °C and °F.**

■ **NOTE: The temperature indicated should be close to room temperature if the snowmobile hasn't recently been run. Consider what temperature the snowmobile is actually at.**

5. If when testing the intake air temperature sensor, an indicated temperature of -40°C and °F is noted and the actual snowmobile temperature isn't close to this temperature, replace the sensor. The ECU will automatically go to -40°C and °F when the intake air temperature sensor fails.

■ **NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.**

WATER TEMPERATURE SENSOR TEST (ENGINE RUNNING) FUNCTION

■ **NOTE: The water temperature sensor can be checked in both Celsius and Fahrenheit. Perform this test on a engine that has not been run in several hours and has coolant at room temperature.**

■ **NOTE: When using an analyzer which has been updated with the new EPROM chip, first select KOKUSAN by pressing the TEST button. This will allow the testing of the batteryless EFI system.**

1. Place the rear of the snowmobile on a safety stand.

2. Attach the analyzer harness (analyzer OFF) to the diagnosis test plug.

3. Switch the analyzer ON.

4. With the analyzer power light illuminated, press the analyzer MENU SELECT buttons repeatedly until the words Water Temperature appear on the display.

Water Temperature

5. Press the TEST button and the display will indicate coolant temperature in both °C and °F. If the temperature displayed doesn't seem close to the actual coolant temperature, replace the sensor.

■ **NOTE: If the water temperature sensor has failed, the ECU will automatically indicate the specifications following for each RPM. If these specifications ARE INDICATED at the RPM shown, replace the water temperature sensor.**

Celsius	Fahrenheit	RPM
0°	32°	Idle to 3000
30°	86°	3000 to 5000
60°	140°	over 5000

■ **NOTE: If proceeding to another test, first press the TEST button once again to cancel the present test. To select a different test function, use the MENU SELECT buttons.**

BAROMETRIC PRESSURE SENSOR TEST (ENGINE OFF) FUNCTION

■ **NOTE: When using an analyzer which has been updated with the new EPROM chip, first select KOKUSAN by pressing the TEST button. This will allow the testing of the batteryless EFI system.**

1. With the analyzer OFF, attach its harness to the diagnosis test plug.

2. Switch the analyzer ON.

3. With the analyzer power light illuminated, press the MENU SELECT buttons repeatedly until the words Barometric Pressure appear on the display.

Barometric Pressure

4. Press the analyzer TEST button and actual area barometric pressure will be indicated.

■ **NOTE: Actual area barometric pressure can be obtained from a local airport, radio station, etc.**

5. If the barometric pressure sensor has failed, the ECU will automatically go to the barometric pressure shown below. If these readings APPEAR on the display, replace the ECU.

Model	Barometric Pressure	
500 EFI	880 mm/hg	(34.65 in./hg)
580 EFI	880 mm/hg	(34.65 in./hg)
600 EFI	880 mm/hg	(34.65 in./hg)

Peak Voltage Tests and Specifications

(1997-2000 Batteryless Models)

■ **NOTE: Use external jacks (red and black) on all tests except trigger coil output test. Use green and black jacks for the trigger coil output test.**

Fuel Pump Coil Test (Static)

1. Remove the spark plugs and ground them to the cylinder heads.

2. Unplug orange leads from stator and test between the two orange wires from the stator.

3. Pull the recoil briskly. Reading should be 13 volts or higher.

Fuel Pump Coil Test (Running)

1. Connect the two orange leads from the stator to the ECU.

2. Insert a paper clip into each orange wire connector making contact with its terminal.

3. Start the engine and test between the two orange leads. Reading should be approximately 13 to 15 volts.

ECU Output To Fuel Pump (Running)

1. With the engine running, test between the red and black leads in the pump connector.

2. Reading should be 12 to 15 volts.

■ **NOTE: If the output between the orange leads to the ECU are within tolerance but the ECU output is low, replace the ECU. If the ECU output is within specifications but the fuel pump fails to operate, replace the fuel pump.**

Injector Coil Output Test (Static)

1. Remove the spark plugs and ground them to the cylinder heads.
2. Unplug the double lead connector at the ECU having two blue/white wires.
3. Test between the two blue/white leads in the connector harness from the stator plate.
4. Pull the recoil briskly. Reading should be approximately 80 volts.

Injector Coil Output Test (Running)

1. Install the spark plugs and tighten securely.
2. Connect the double lead connector to the ECU leaving just enough room to make contact with the meter test probes.
3. Start the engine and test between the two blue/white leads in the double connector. Reading should be approximately 20 to 22 volts.

ECU Output To The Injectors (Number 1 Injector)

1. Using two paper clips, insert them into the number 1 (MAG-side) connector (yellow and yellow/red leads) at the injector from the back side. Leave the connector attached to the injector. Touch red meter lead to yellow and black to yellow/red.
2. Start the engine. Reading should be approximately 20 volts.

■ **NOTE: Repeat the same test as above for injector number 2. Switch meter leads to the green and green/red leads. Reading should be approximately 20 volts.**

High Speed Charge Coil Test (Static)

1. Remove the spark plugs and ground them to the cylinder heads.
2. Unplug the triple plug connector (brown - black - green) from the ECU.
3. Test between the green and black wires in the triple plug connector from the stator. Pull the recoil briskly. Reading should be 48 volts or higher.

High Speed Charge Coil Test (Running)

1. Install the spark plugs and tighten securely.
2. Connect the triple lead connector to the ECU; then using two paper clips enter the connector from the back side and make contact with the green and black wire terminals.
3. Start the engine and test between the green and black wires in the triple lead connector. Readings should be as follows:

RPM	VOLTS
2000	112
3000	168
4000	216

Low Speed Charge Coil Test (Static)

1. Remove the spark plugs and ground them to the cylinder heads.
2. Unplug the triple plug connector (brown -black - green) from the ECU.
3. Test between the green and brown wires in the triple plug connector from the stator. Pull the recoil briskly. Reading should be 84 volts or higher.

Low Speed Charge Coil Test (Running)

1. Install the spark plugs and tighten securely.
2. Using two small paper clips, enter the back side of the triple plug connector and make contact with the green and brown terminals. Be careful so paper clips don't contact each other.
3. Start the engine and test between the green and black wires. Readings should be as follows:

RPM	VOLTS
2000	104
3000	176
4000	200

ECU Output To External Coil (Static)

1. Remove the spark plugs and ground them to the cylinder heads.
2. Leaving the external coil connected to the ECU, contact one small lead with the black meter probe and the other small lead with the red probe. Pull the recoil briskly. Reading should be 145 volts or higher.

ECU Output To External Coil (Running)

1. Install the spark plugs and tighten securely.
2. Connect the black meter probe to one small lead and the red probe to the other small lead.
3. Start the engine. Readings should be as follows:

RPM	VOLTS
2000	154
3000	152
4000	156

■ **NOTE: If the CDI unit isn't within specifications and if the high and low speed charge coil readings were within specifications, replace the ECU.**

Ignition Timing Sensor Output (Static)

1. Remove the spark plugs and ground them to the cylinder heads.
2. Unplug the 2-lead connector of the timing sensor harness. Test between the green/white and brown wires in the connector from the sensor.
3. Pull the recoil briskly. Reading should be 1.5 volts or higher.

Air Temperature Sensor Output Voltage Test From ECU

1. Remove the spark plugs and ground them to the cylinder heads.
2. Unplug the blue and black leads from the air temperature sensor.
3. Test between the blue and black leads from the ECU. Pull the recoil briskly. Reading should be approximately 4.5 to 5 volts.

Water Temperature Sensor Output Voltage Test From ECU

1. Remove the spark plugs and ground them to the cylinder heads.
2. Unplug the yellow and black leads from ECU to the water temperature sensor. Test between the yellow and black leads from the ECU. Pull the recoil briskly. Reading should be approximately 4.5 to 5 volts.

■ **NOTE: If either the air temperature or water temperature sensor output test is low, retest to confirm results. If either test remains out of specifications, replace the ECU.**

Throttle Position Sensor

Arctic Cat does not recommend replacement of the throttle position sensor on the batteryless EFI system. If the sensor should malfunction, the complete throttle body assembly must be replaced.

■ **NOTE: It is important to order a throttle body assembly with the same symbol marking on the injectors as the ones being replaced. The symbol is located on the side of the injector top.**

Throttle Body Flange

REMOVING

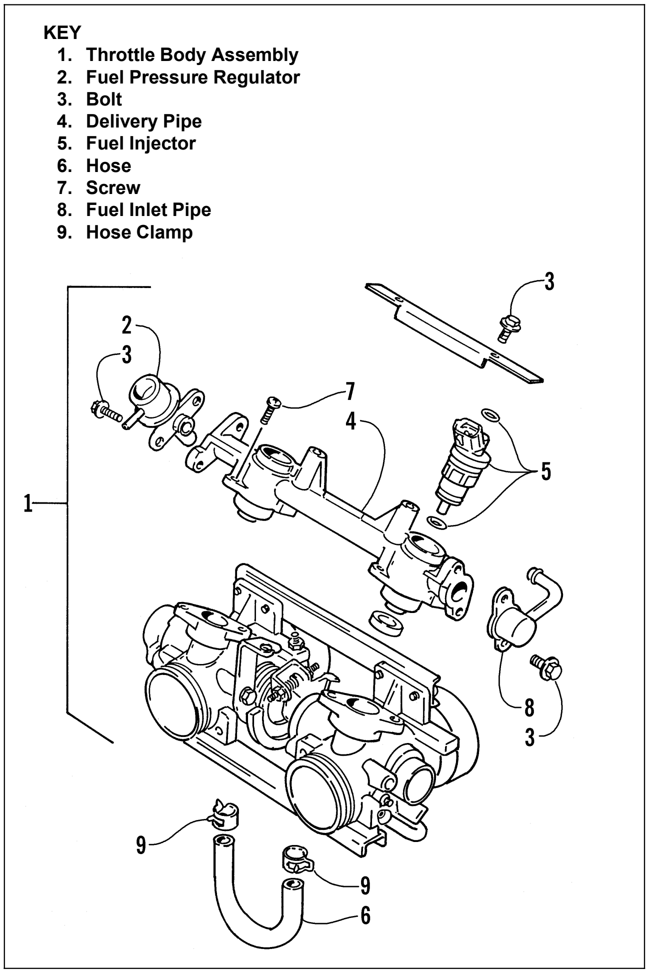
1. Loosen the clamps securing the throttle body assembly to the throttle body flanges.
2. Remove the throttle body assembly from the flanges.
3. In turn on each flange, remove the two nuts, lock washers, and flat washers securing the intake flange to the cylinder; then remove the flange.

INSTALLING

1. Apply a thin coat of high-temperature silicone to the cylinder side of each flange; then attach each flange to a cylinder and secure each with two flat washers, lock washers, and nuts. Tighten to 1.5-1.9 kg-m (11-14 ft-lb).
2. Install the flange clamps on the flanges; then place the throttle body assembly into the flanges and secure with the clamps.
3. Secure all wires and hoses with cable ties.

Throttle Body Assembly

Fig. 4-144



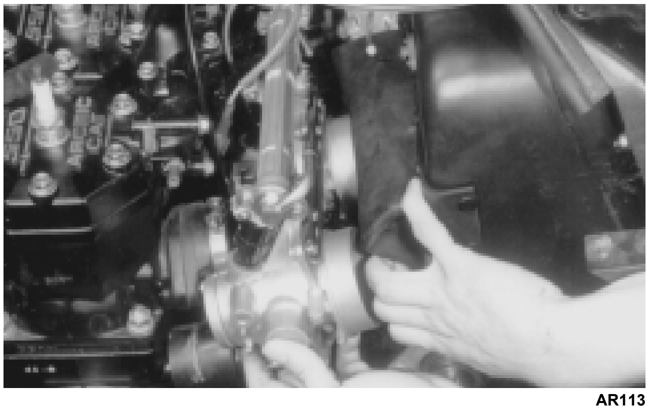
REMOVING

1. Disconnect the wiring harness from each injector and from the throttle valve sensor connector.
2. Remove the coolant hose from the PTO-side of the throttle body and plug it to prevent leakage.
3. Remove the fuel return and supply hoses from the fuel pressure regulator and delivery pipe. Label for assembly.

> ⚠ **CAUTION**
>
> **Since the fuel supply hose may be under pressure, remove it slowly to release the pressure. Place an absorbent towel around the connection to absorb fuel.**

4. Loosen the flange clamps.
5. Slide the throttle body assembly out of the flanges; then loosen the jam nut securing the throttle cable and remove.
6. Remove the throttle body.

Fig. 4-145

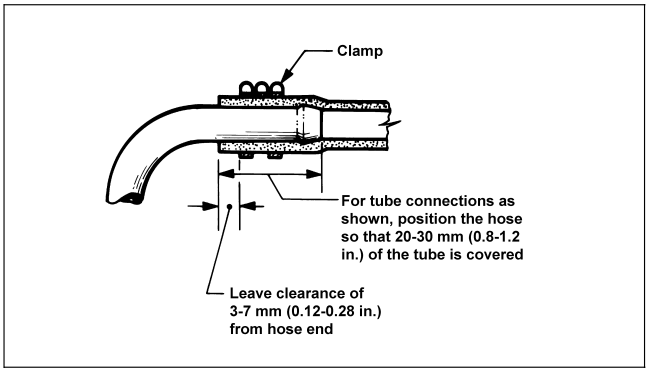


INSTALLING

1. Attach the throttle cable to the throttle body. Secure with jam nut.
2. Place the throttle body assembly into position. Make sure the flanges and boots are positioned properly. Secure with flange clamps.
3. Secure the fuel supply and return hoses to the delivery pipe and regulator.

> ⚠ **CAUTION**
>
> **These hoses must be connected to the correct fittings.**

Fig. 4-146



4. Secure the coolant hose to throttle body assembly.
5. Connect the wiring harness to each injector and throttle valve sensor.

6. Place the rear of the snowmobile on a shielded safety stand and start the engine without touching the throttle. It may idle slowly and stop. Restart using the same procedure until the engine starts and builds RPM on its own.

⚠ WARNING

Check all hose connections for leakage. Repair as necessary.

7. Check the cooling system.
8. Adjust the throttle cable as necessary.

Throttle Cable

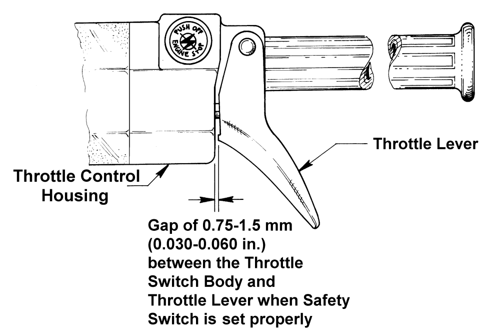
REMOVING

1. Open the belt guard and remove the belt.
2. Remove the driven pulley.
3. Remove the E-clip securing the oil-injection cable to the oil-injection pump control arm. Account for a washer.
4. Loosen the oil-injection cable jam nuts.
5. Loosen the throttle cable jam nuts.
6. Remove the throttle cable from the throttle body assembly.
7. Remove the handlebar pad.
8. Remove the cable ties securing the throttle cable.
9. Remove the throttle cable end from the throttle lever.
10. Remove the retaining ring securing the cable to the throttle switch assembly; then remove the cable from the throttle switch assembly.

INSTALLING/ADJUSTING

1. Install the throttle cable into the throttle switch assembly. Secure with a retaining ring.
2. Install the throttle cable end on the throttle lever.
3. Route the throttle cable from the throttle switch assembly to the throttle body assembly and oil-injection pump; avoid any sharp bends or moving components.
4. Attach the throttle cable to the throttle body.
5. Install the oil-injection cable adjuster on the oil-injection pump; secure with the jam nuts.
6. Install the oil-injection cable on the control arm; secure with a washer and E-clip.
7. Secure the throttle cable to the steering post with cable ties.
8. Install the handlebar pad.
9. Adjust the throttle cable tension by turning the jam nuts in the appropriate direction until there is 0.75-1.5 mm (0.030-0.060 in.) free-play in the throttle lever and the butterfly completely opens and closes. Tighten the jam nuts securely.

Fig. 4-147



733-081C

⚠ CAUTION

Compress the throttle control lever to ensure free movement. If the throttle cable sticks or binds, correct the problem before starting the engine.

10. Synchronize the oil-injection pump.
11. Install the driven pulley.
12. Install the belt and secure the belt guard.

BASIC EFI SYSTEM INFORMATIOM

Item			Description
Basic system		Fuel supply system	Electronically controlled multi-point injection
		Ignition system	(CDI system) Digital
Air/fuel flow meter		System	O/N (throttle opening/engine revolution) system & atmospheric pressure compensation
		Component parts	Throttle opening sensor Atmospheric pressure sensor
Injection system			One time simultaneous injection per revolution (synchronized ignition)
Fuel system		Fuel pressure	Regulated high pressure 37.9 ± 2.2 psi
		Fuel return	Pressure regulated by pressure regulator. There are fuel returns.
Throttle system		System	1 stage x duplex (1 bore/cylinder)
		Diameter of the bore	46 x 2 (Effective area equivalent to 40)
		Type of valve	Butterfly type
		Operating angle	80° (full closed angle 10°)
		Radius of drum	R25 (at wire center)
Adjusting system for idle revolution			Throttle adjusting screw type
Component parts and specifications	Control unit		Fuel injection control
	Fuel system	Fuel pump	Gear type
		Injection	Side feed type
		Pressure regulator	Diaphragm type
		Fuel filter	Fine screens on pick-up hose
		Fuel piping	High pressure specification 37.9 ± 2.2 psi
	Throttle body		1 bore/cylinder x duplex
	Sensor, etc.	Throttle sensor	Revolution scrubbing type potentiometer
		Pressure sensor	Semiconductor type
		Water temperature sensor	Thermistor type
		Intake air temperature sensor	Thermistor type
	Cable harness		Equivalent to current harness
	Other		Batteryless EFI System

EFI COMPONENT VOLTAGE/RESISTANCE CHART AIR TEMPERATURE

TEMP/C	TEMP/F	VOLTAGE	OHMS
100	212	0.113	555
98	208	0.121	595
96	205	0.128	635
94	201	0.136	675
92	198	0.143	715
90	194	0.151	755
88	190	0.162	819
86	187	0.173	883
84	183	0.184	947
82	180	0.195	1011
80	176	0.206	1075
78	172	0.222	1160
76	169	0.238	1245
74	165	0.253	1330
72	162	0.269	1415
70	158	0.285	1500
68	154	0.308	1640
66	151	0.331	1780
64	147	0.353	1920
62	144	0.376	2060
60	140	0.399	2200
58	136	0.432	2410
56	133	0.465	2620
54	129	0.498	2830
52	126	0.531	3040
50	122	0.564	3250
48	118	0.612	3595
46	115	0.659	3940
44	111	0.707	4285
42	108	0.754	4630
40	104	0.802	4975
38	100	0.869	5490
36	97	0.937	6005
34	93	1.004	6520
32	90	1.072	7035
30	86	1.139	7550

TEMP/C	TEMP/F	VOLTAGE	OHMS
28	82	1.230	8540
26	79	1.322	9530
24	75	1.413	10520
22	72	1.505	11510
20	68	1.596	12500
18	64	1.716	14020
16	61	1.836	15540
14	57	1.955	17060
12	54	2.075	18580
10	50	2.195	20100
8	46	2.323	23060
6	43	2.452	26020
4	39	2.580	28980
2	36	2.709	31940
0	32	2.837	34900
-2	28	2.969	39940
-4	25	3.101	44980
-6	21	3.233	50020
-8	18	3.365	55060
-10	14	3.497	60100
-12	10	3.610	76080
-14	7	3.722	92060
-16	3	3.835	108040
-18	-0.4	3.947	124020
-20	-4	4.060	140000
-22	-8	4.142	156000
-24	-11	4.224	172000
-26	-15	4.306	188000
-28	-18	4.388	204000
-30	-22	4.470	220000
-32	-26	4.522	261000
-34	-29	4.574	302000
-36	-32	4.625	343000
-38	-36	4.677	384000
-40	-40	4.729	425000

EFI COMPONENT VOLTAGE/RESISTANCE CHART WATER TEMPERATURE

TEMP/C	TEMP/F	VOLTAGE	OHMS
110	230	0.115	129
108	226	0.129	137
106	223	0.143	145
104	219	0.157	153
102	216	0.171	161
100	212	0.185	169
98	208	0.192	180
96	205	0.199	191
94	201	0.206	202
92	198	0.213	213
90	194	0.220	224
88	190	0.235	240
86	187	0.250	256
84	183	0.265	273
82	180	0.280	289
80	176	0.295	305
78	172	0.317	327
76	169	0.339	349
74	165	0.361	371
72	162	0.383	393
70	158	0.405	415
68	154	0.438	445
66	151	0.471	475
64	147	0.504	505
62	144	0.537	535
60	140	0.570	565
58	136	0.598	609
56	133	0.626	653
54	129	0.654	697
52	126	0.682	741
50	122	0.710	785
48	118	0.759	849
46	115	0.808	913
44	111	0.857	977
42	108	0.906	1041
40	104	0.955	1105
38	100	1.023	1214
36	97	1.091	1323
34	93	1.159	1432
32	90	1.227	1541
30	86	1.295	1650

TEMP/C	TEMP/F	VOLTAGE	OHMS
28	82	1.377	1800
26	79	1.459	1950
24	75	1.541	2100
22	72	1.623	2250
20	68	1.705	2400
18	64	1.806	2670
16	61	1.907	2940
14	57	2.008	3210
12	54	2.109	3480
10	50	2.210	3750
8	46	2.327	4170
6	43	2.444	4590
4	39	2.561	5010
2	36	2.678	5430
0	32	2.795	5850
-2	28	2.901	6510
-4	25	3.007	7170
-6	21	3.113	7830
-8	18	3.219	8490
-10	14	3.325	9150
-12	10	3.421	9422
-14	7	3.517	9694
-16	3	3.613	9966
-18	-0.4	3.709	10238
-20	-4	3.805	10510
-22	-8	3.885	13688
-24	-11	3.965	16866
-26	-15	4.045	20044
-28	-18	4.125	23222
-30	-22	4.205	26400
-32	-26	4.267	30520
-34	-29	4.329	34640
-36	-32	4.391	38760
-38	-36	4.453	42880
-40	-40	4.515	47000
-42	-44	4.553	55100
-44	-47	4.591	63200
-46	-51	4.629	71300
-48	-54	4.667	79400
-50	-58	4.705	87500

EFICOMP3

EFI EPROM CHIP USAGE CHART (1971-1998)

PART NUMBER	MODEL	SYSTEM	FUEL	COLOR/ SYMBOL
3004-103	1991 700	Battery	Gas	Red
3004-104	1991 700	Battery	Gas	Yellow
3004-105	1991 700	Battery	Gas	Blue
3004-242	1991 700	Battery	Ethanol	Red
3004-243	1991 700	Battery	Ethanol	Yellow
3004-244	1991 700	Battery	Ethanol	Blue
3004-271	1992 550	Battery	Gas	Red
3004-272	1992 550	Battery	Gas	Yellow
3004-273	1992 550	Battery	Gas	Blue
3004-239	1992 550	Battery	Ethanol	Red
3004-240	1992 550	Battery	Ethanol	Yellow
3004-241	1992 550	Battery	Ethanol	Blue
3004-109	1992 700	Battery	Gas	Red
3004-110	1992 700	Battery	Gas	Yellow
3004-111	1992 700	Battery	Gas	Blue
3004-245	1992 700	Battery	Ethanol	Red
3004-246	1992 700	Battery	Ethanol	Yellow
3004-247	1992 700	Battery	Ethanol	Blue
3004-291	1993 700	Battery	Gas	Red
3004-292	1993 700	Battery	Gas	Yellow
3004-293	1993 700	Battery	Gas	Blue
3004-248	1993 700	Battery	Ethanol	Red
3004-248	1993 700	Battery	Ethanol	Yellow
3004-250	1993 700	Battery	Ethanol	Blue
3004-271	1993 550	Battery	Gas	Red
3004-272	1993 550	Battery	Gas	Yellow
3004-273	1993 550	Battery	Gas	Blue
3004-239	1993 550	Battery	Ethanol	Red
3004-240	1993 550	Battery	Ethanol	Yellow
3004-241	1993 550	Battery	Ethanol	Blue
3004-681	1994 700	Battery	Gas	Red
3004-682	1994 700	Battery	Gas	Yellow
3004-683	1994 700	Battery	Gas	Blue
3004-312	1994 700	Battery	Ethanol	Red
3004-313	1994 700	Battery	Ethanol	Yellow
3004-314	1994 700	Battery	Ethanol	Blue
3004-902	1994 580	Battery	Gas	Red
3004-903	1994 580	Battery	Gas	Yellow
3004-904	1994 580	Battery	Gas	Blue
3004-309	1994 580	Battery	Ethanol	Red
3004-310	1994 580	Battery	Ethanol	Yellow
3004-311	1994 580	Battery	Ethanol	Blue
3004-678	1994 550	Battery	Gas	Red
3004-679	1994 550	Battery	Gas	Yellow
3004-680	1994 550	Battery	Gas	Blue
3004-306	1994 550	Battery	Ethanol	Red
3004-307	1994 550	Battery	Ethanol	Yellow
3004-308	1994 550	Battery	Ethanol	Blue
3004-694	1994 440	Battery	Gas	Red
3004-695	1994 440	Battery	Gas	Yellow
3004-696	1994 440	Battery	Gas	Blue
3004-303	1994 440	Battery	Ethanol	Red
3004-304	1994 440	Battery	Ethanol	Yellow
3004-305	1994 440	Battery	Ethanol	Blue
3004-662	1995 700	Battery	Gas	Red
3004-663	1995 700	Battery	Gas	Yellow
3004-664	1995 700	Battery	Gas	Blue

PART NUMBER	MODEL	SYSTEM	FUEL	COLOR/ SYMBOL
3004-732	1995 700	Battery	Ethanol	Red
3004-733	1995 700	Battery	Ethanol	Yellow
3004-734	1995 700	Battery	Ethanol	Blue
3004-906	1995 580	Battery	Gas	Red
3004-907	1995 580	Battery	Gas	Yellow
3004-908	1995 580	Battery	Gas	Blue
3004-735	1995 580	Battery	Ethanol	Red
3004-736	1995 580	Battery	Ethanol	Yellow
3004-737	1995 580	Battery	Ethanol	Blue
3004-662	1996 700	Battery	Gas	Red
3004-663	1996 700	Battery	Gas	Yellow
3004-664	1996 700	Battery	Gas	Blue
3004-933	1996 580	Battery	Gas	Red
3004-934	1996 580	Battery	Gas	Yellow
3004-935	1996 580	Battery	Gas	Blue
3004-938	1996 580	Battery	Ethanol	Red
3004-939	1996 580	Battery	Ethanol	Yellow
3004-940	1996 580	Battery	Ethanol	Blue
3005-036	1997 580	Battery*	Gas	Red
3005-037	1997 580	Battery*	Gas	Yellow
3005-038	1997 580	Battery*	Gas	Blue
3005-092	1997 580	Battery*	Ethanol	Red
3005-093	1997 580	Battery*	Ethanol	Yellow
3005-094	1997 580	Battery*	Ethanol	Blue
3005-088	1997 580	Batteryless	Gas	●
3005-089	1997 580	Batteryless	Gas	■
3005-090	1997 580	Batteryless	Gas	▲
3005-098	1997 580	Batteryless	Ethanol	●
3005-099	1997 580	Batteryless	Ethanol	■
3005-100	1997 580	Batteryless	Ethanol	▲
3005-036	1998 580	Battery	Gas	Red
3005-037	1998 580	Battery	Gas	Yellow
3005-038	1998 580	Battery	Gas	Blue
3005-092	1998 580	Battery	Ethanol	Red
3005-093	1998 580	Battery	Ethanol	Yellow
3005-094	1998 580	Battery	Ethanol	Blue
3005-192	1998 580	Batteryless	Gas	●
3005-193	1998 580	Batteryless	Gas	■
3005-194	1998 580	Batteryless	Gas	▲
3005-273	1998 580	Batteryless	Ethanol	●
3005-274	1998 580	Batteryless	Ethanol	■
3005-275	1998 580	Batteryless	Ethanol	▲
3005-463	1998 600	Batteryless	Gas	●
3005-464	1998 600	Batteryless	Gas	■
3005-465	1998 600	Batteryless	Gas	▲
3005-477	1998 600	Batteryless	Ethanol	●
3005-478	1998 600	Batteryless	Ethanol	■
3005-479	1998 600	Batteryless	Ethanol	▲

■ **NOTE: Kokusan EPROM must be marked K.**

*** DC EPROM will not interchange with previous years.**

EFI EPROM CHIP USAGE CHART (1999-2000)

PART NUMBER	MODEL	SYSTEM	FUEL	COLOR/ SYMBOL
3005-463	1999 600	Batteryless	Both	●
3005-464	1999 600	Batteryless	Both	■
3005-465	1999 600	Batteryless	Both	▲
3005-466	1999 500	Batteryless	Both	●
3005-467	1999 500	Batteryless	Both	■
3005-468	1999 500	Batteryless	Both	▲
3005-469	1999 580	Batteryless	Both	●
3005-470	1999 580	Batteryless	Both	■
3005-471	1999 580	Batteryless	Both	▲

PART NUMBER	MODEL	SYSTEM	FUEL	COLOR/ SYMBOL
3005-672	2000 600	Batteryless	Both	●
3005-673	2000 600	Batteryless	Both	■
3005-674	2000 600	Batteryless	Both	▲
3005-615	2000 500	Batteryless	Both	●
3005-616	2000 500	Batteryless	Both	■
3005-617	2000 500	Batteryless	Both	▲
3005-618	2000 580	Batteryless	Both	●
3005-619	2000 580	Batteryless	Both	■
3005-620	2000 580	Batteryless	Both	▲

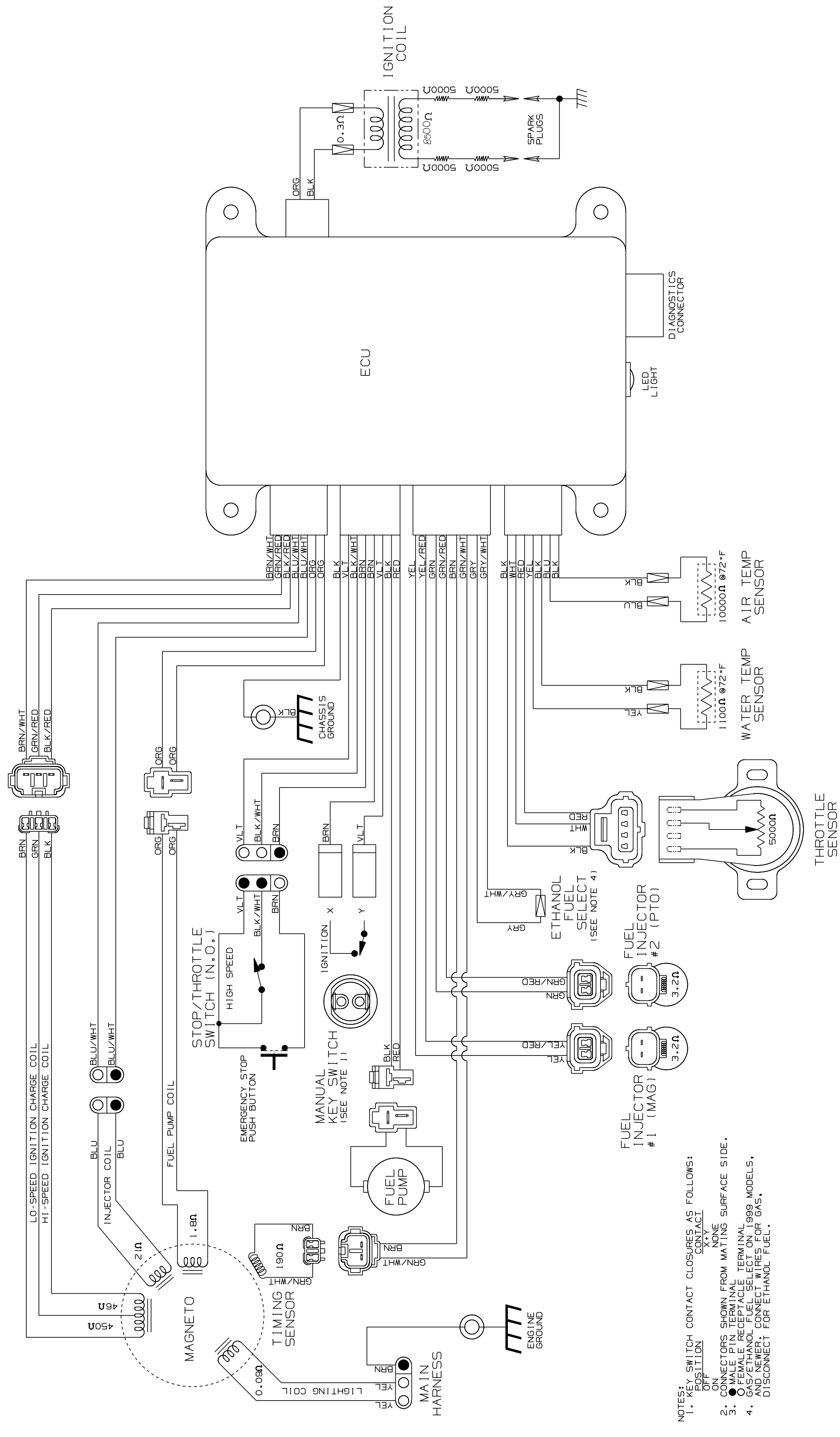
■ **NOTE: Kokusan EPROM must be marked K.**

Troubleshooting Fuel System (EFI)

Problem: Too Rich	
Condition	**Remedy**
1. **LED** trouble code	1. Replace problem sensor
2. **Fuel pressure** too high	2. Replace regulator
3. **Fuel return hose** obstructed	3. Service — replace hose — remove obstruction
4. **Injectors** leaking	4. Replace injectors

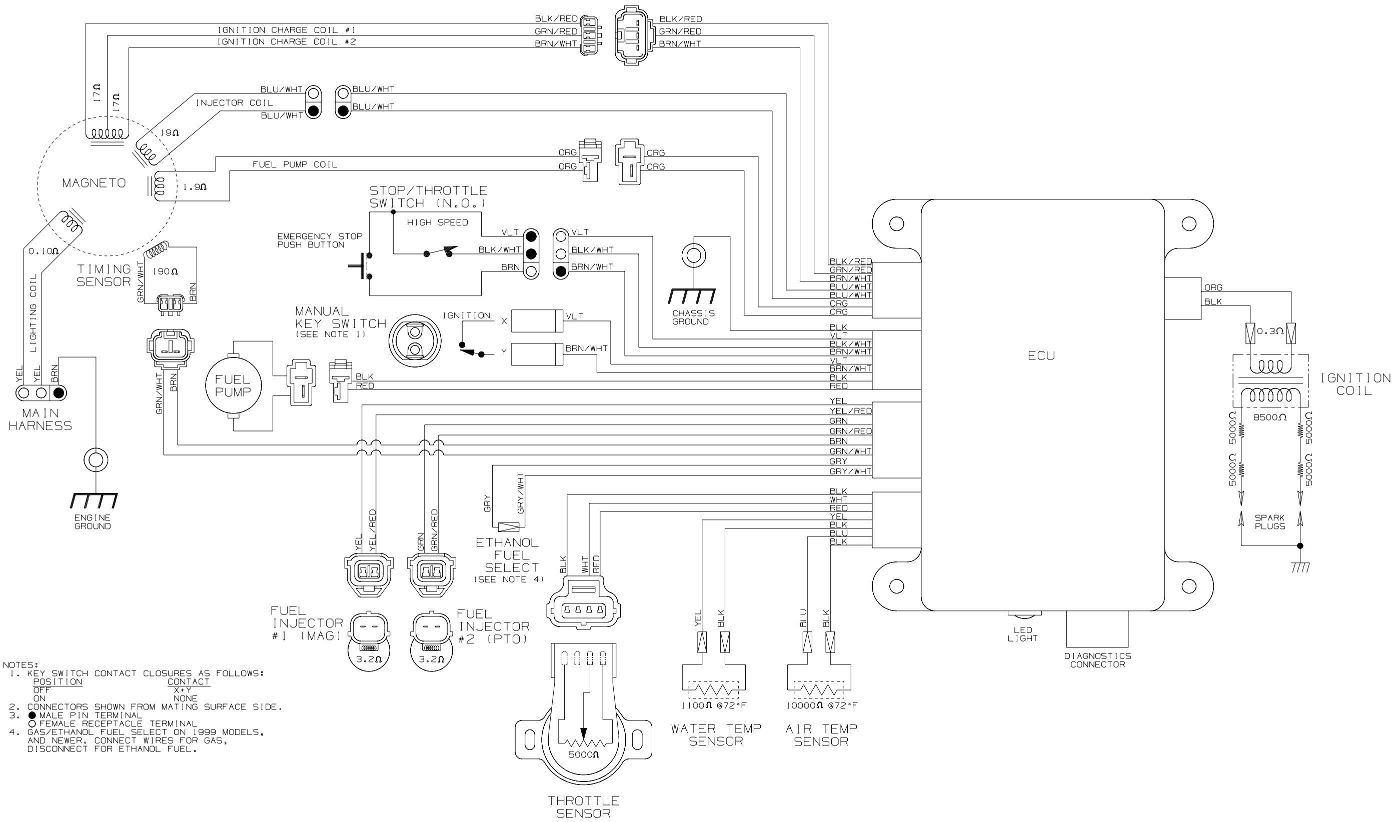
Problem: Too Lean	
Condition	**Remedy**
1. **LED** trouble code	1. Replace problem sensor
2. **Fuel pressure** too low	2. Replace regulator/fuel pump
3. **Vent hose** obstructed	3. Remove obstruction
4. **Fuel filter(s)** obstructed	4. Replace fuel filter(s)

EFI Wiring Diagram (500/580 cc)



686-425A

EFI Wiring Diagram (600 cc)



NOTES:

1. KEY SWITCH CONTACT CLOSURES AS FOLLOWS:

POSITION	CONTACT
OFF	X+Y
ON	NONE

2. CONNECTORS SHOWN FROM MATING SURFACE SIDE.
3. ● MALE PIN TERMINAL
   ○ FEMALE RECEPTACLE TERMINAL
4. GAS/ETHANOL FUEL SELECT ON 1999 MODELS, AND NEWER. CONNECT WIRES FOR GAS, DISCONNECT FOR ETHANOL FUEL.

0686-672

Fuel System (Related Items)

Whenever any maintenance or inspection is made on the fuel system in which fuel leakage may occur, there should be no welding, smoking, or open flames in the area.

■ **NOTE: Some photographs used in this section are used for clarity purposes only and are not designed to depict actual conditions.**

Fuel System (Related Items) Table of Contents

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Air-Intake Silencer (Cover/Tool Tray Style) . . 4-71
Gas Tank/Seat Assembly 4-72

Oil-Injection Pump

REMOVING

1. Turn the fuel shut-off valve to the CLOSED position.
2. If applicable, remove the carburetors.
3. Disconnect the oil-supply hose from the pump and plug to prevent oil drainage.
4. Remove the two oil-delivery hoses from the adapter plates.
5. Disconnect the oil-injection cable.
6. Remove the two screws, lock washers, and washers securing the oil-injection pump and retainer to the crankcase.

Fig. 4-148



AB078

7. Pull the oil-injection pump away from the engine and account for a gasket.
8. Turn the pump sideways; then remove the lower union bolt. Account for two gaskets. Remove the pump.
9. Remove the remaining union bolts securing the check valves to the pump. Account for two gaskets.
10. Remove the check valves. Account for two gaskets.

INSTALLING

1. In turn on each front union bolt, install a gasket, check valve, and gasket; then install on the oil-injection pump.
2. Place the gasket and oil-injection pump near the engine; then install the lower union bolt through a gasket, check valve, and gasket.
3. Position the oil-injection pump on the engine making sure the oil-injection pump gear is correctly aligned with the oil-injection pump drive gear.
4. Secure the pump with two screws, lock washers, and washers. Tighten screws to 0.7 kg-m (5 ft-lb).
5. Connect the two oil-delivery hoses to the adapter plates. Secure with clamps.
6. Connect the oil-injection cable to the pump and secure with the washer and E-clip.
7. Connect the oil-supply hose to the oil-injection pump inlet fitting. Secure with the clamp.
8. Bleed the oil-injection system (see Bleeding Oil-Injection System in this sub-section).
9. Check the oil-injection system synchronization (see Synchronizing Oil-Injection Pump in this sub-section). Tighten the jam nuts securely.
10. If applicable, install the carburetors.
11. Turn the fuel shut-off valve to the OPEN position.

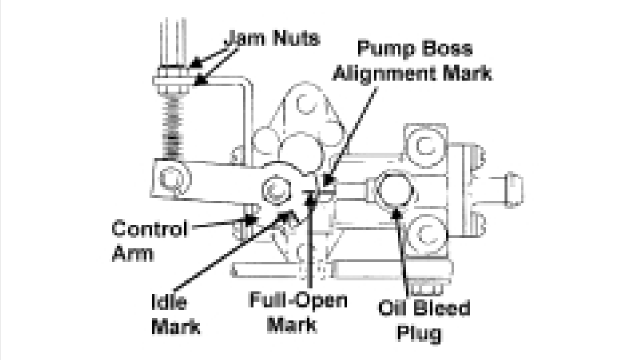
Synchronizing Oil-Injection Pump

CHECKING

1. With the ignition switch key in the OFF position, move the throttle lever to the full-open position.

2. Check the alignment of the mark on the pump housing and the mark on the control arm. If the marks align, the oil-injection pump is synchronized with the carburetors and no adjustment is necessary. If the marks do not align, adjust until alignment is attained.

Fig. 4-149



727-185C

ADJUSTING

1. Loosen the jam nuts securing the cable adjuster.

2. Move the throttle lever to the full-open position.

3. Rotate the jam nuts in the proper direction until the marks align.

4. Lock the jam nuts to secure the adjustment.

Bleeding Oil-Injection System

⚠ CAUTION

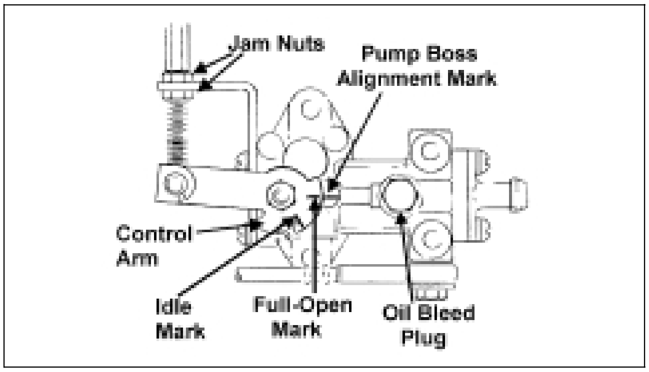
Whenever bleeding the oil-injection system, use a 100:1 gas/oil mixture in the gas tank to ensure adequate engine lubrication. Failure to use the 100:1 mixture during oil-injection system bleeding will result in severe engine damage.

1. Fill the oil reservoir with Arctic Cat 50:1 Injection Oil.

2. Place an absorbent towel below the oil bleed screw; then remove the bleed screw from the pump. Allow the oil to flow through the oil-supply hose until the hose is filled with oil and free of air bubbles; then install the bleed screw.

■ **NOTE. To aid in bleeding the oil system, blow into the vent hose to force the oil toward the pump. The oil reservoir cap must be on for this procedure.**

Fig. 4-150



727-185C

3. Using a shielded safety stand, raise the rear of the snowmobile. Engage the brake lever lock; then start the engine and allow it to idle.

4. Using a stiff wire with a hooked end, pull the control arm upward to the full-open position.

⚠ WARNING

Keep hands and clothing away from all moving or rotating parts.

5. Idle the engine until oil flowing to the top of the oil-delivery hoses is free of air bubbles.

6. When oil flows free of all air bubbles, shut the engine off and check for leakage.

7. Release the brake lever lock.

4

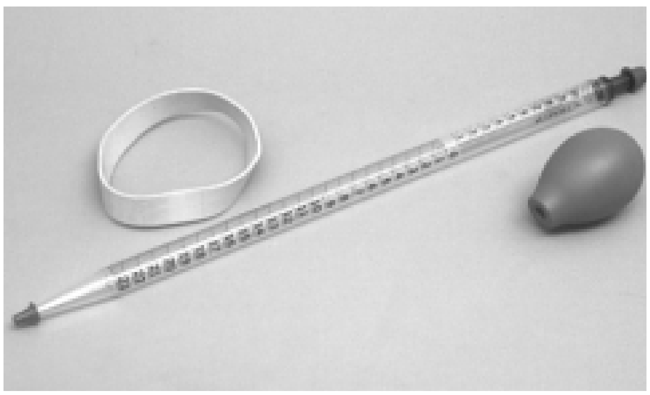
Testing Oil-Injection Pump

⚠ WARNING

Always wear safety glasses when performing this test.

1. Tighten the oil reservoir cap securely. Attach Vacuum Test Pump (p/n 0644-131) to the oil reservoir vent hose; then create vacuum in the reservoir.

Fig. 4-151



AE108

2. Place an absorbent towel under the oil reservoir supply hose fitting; then remove the oil-supply hose from the oil reservoir. Plug the fitting with the small red plug.

3. Fill the Oil Injection Usage Tool (p/n 0644-007) with Arctic Cat 50:1 Injection Oil to the 0 line.

4. Wipe the tip of the tool to remove excess oil; then attach the tool to the oil-supply hose and remove the bulb.

5. Secure the tool to the oil reservoir by twisting the rubber strap one half turn and placing the rubber strap around the tool and the oil reservoir filler neck.

⚠ WARNING

Keep hands and clothing away from all moving or rotating parts.

6. Start the engine and run the engine at 3000 RPM for 3 minutes with the control arm in the FULL-CLOSED position. Compare the amount of oil used against the specifications on the chart.

7. Using a stiff wire, pull the oil-injection control arm to the FULL-OPEN position. Run the engine at 3000 RPM for 2 minutes. Compare the amount of oil used against the specifications on the chart.

Oil Consumption @3000 RPM		
MODEL	**FULL-CLOSED 3 Minutes**	**FULL-OPEN 2 Minutes**
340 cc	1.5-2.8 cc	4.2-6.3 cc
370 cc F/C	0.975-1.86 cc	5.4-6.6 cc
440 cc F/C	2.5-4.6 cc	6.2-9.2 cc
440 cc F/C (Triple Carb)	2.5-4.6 cc	6.5-9.2 cc
440 cc L/C	1.5-3.0 cc	8.0-12.7 cc
ZR 440- (Consumer Model)	1.1-3.2 cc	9.4-11.5 cc
500 cc	2.0-3.9 cc	11.3-14.1 cc
500 cc EFI	1.956-3.413 cc	11.275-14.122 cc
550 cc	2.0-4.3 cc	10.2-15.5 cc
580 cc	2.0-4.3 cc	10.2-15.5 cc
600 cc (2 cyl)	2.0-3.9 cc	11.3-14.1 cc
600 cc (3 cyl)	1.1-2.2 cc	11.3-14.1 cc
600 cc EFI	1.727-4.247 cc	9.224-11.558 cc
700 cc	1.613-2.996 cc	12.442-15.206 cc
800 cc	1.0-2.3 cc	14.9-18.2 cc
1000 cc	1.3-3.7 cc	16.2-19.8 cc

8. If the oil-injection pump output does not meet the specifications, see Testing Oil-Injection Check Valves in this sub-section.

9. Disconnect the oil usage tool, remove the plug from the reservoir, attach the oil-supply hose to the oil reservoir, and remove the vacuum pump.

10. Bleed the oil-injection system (see Bleeding Oil-Injection System in this sub-section).

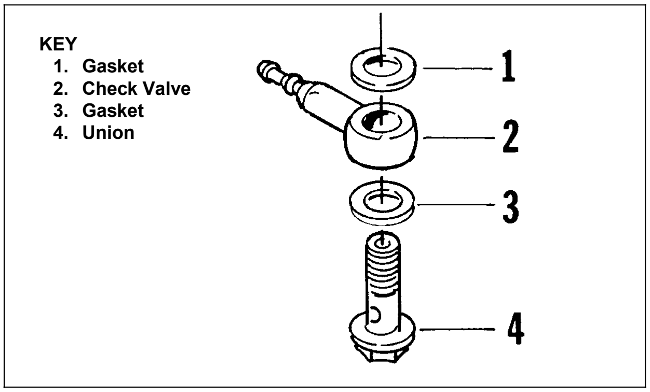
Testing Oil-Injection Check Valves

In the event there is an engine problem due to lack of lubrication, the oil-injection pump check valves should be tested using a vacuum pump to make sure the check valves are operating properly.

When testing the check valves, remove them from the pump assembly.

1. Remove the check valves from the oil-injection pump.

Fig. 4-152



731-551A

2. Attach the vacuum test pump hose to the check valve.

3. Squeeze the vacuum pump handle and watch the pump gauge. The check valve should release at 4.5-5 lb and again reset itself at 3.5-4 lb. If "release" and "reset" are not within specifications, replace the check valve.

4. Record the "release" and "reset" readings for the valve; then perform the test on the other valve. The "release" and "reset" readings must fall within specifications and must be within 1.5 lb of each other. If either or both are not met, replace the check valves.

5. If the check valves are within specifications but the oil-injection usage is not, replace the oil-injection pump.

Fuel Pump
(Carbureted Models)

■ **NOTE: When servicing a fuel pump, determine which style pump is being serviced and follow the appropriate procedure.**

PRELIMINARY CHECKS

1. Make sure the fuel shut-off valve is in the OPEN position.

2. Make sure there is adequate gasoline in the gas tank.

3. Make sure all hoses are clear and free of kinks and obstructions.

4. Make sure the fuel filter is not plugged or damaged.

5. Make sure fuel and impulse hoses are in good condition.

6. Make sure there is evidence of good impulse at the crankcase impulse fitting.

TESTING PRESSURE

1. Connect a pressure gauge between fuel pump and carburetor using a piece of fuel hose and a T-fitting.

2. Place snowmobile on a safety stand and start the engine. At the following engine speeds, the specified pressures must be indicated.

RPM	psi	g/cm^2
1000-2000	3.0-3.5	200-240
3000-4000	4.5-5.5	310-375
5000-6000	6.0-7.0	420-490

3. Remove gauge and hose and connect fuel hose to carburetor.

TESTING VACUUM

■ **NOTE: Make sure adequate fuel is in the carburetor for this test.**

1. Turn the fuel shut-off valve to the CLOSED position; then disconnect fuel supply hose from the fuel shut-off valve.

2. Connect a vacuum gauge directly to the fuel pump inlet fitting.

3. With snowmobile on a safety stand, start the engine and accelerate to 2000-3000 RPM for a period of 30 seconds. Note maximum reading of gauge. Reading must be within the range listed.

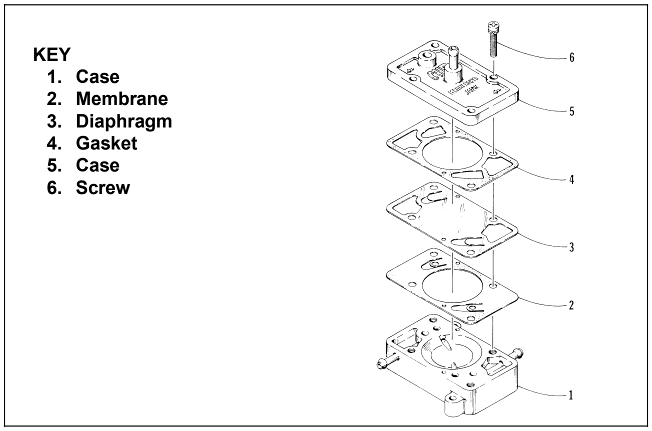
Acceptable Fuel Pump Vacuum (2-3000 RPM)	
in.-hg	mm-hg
7-10	175-250

4. Stop engine. Connect fuel hose. Turn the fuel shut-off valve to the OPEN position.

4

SERVICING

Fig. 4-153



0727-830

1. Scribe a line across the fuel pump sections.

2. Remove the screws securing the fuel pump; then from the top of the fuel pump, remove the top case, gasket, diaphragm, and membrane.

■ **NOTE: Be sure all fuel pump components are clean and the fittings are tight.**

3. In sequence on the bottom case of the fuel pump, place the membrane, diaphragm, gasket, and top case.

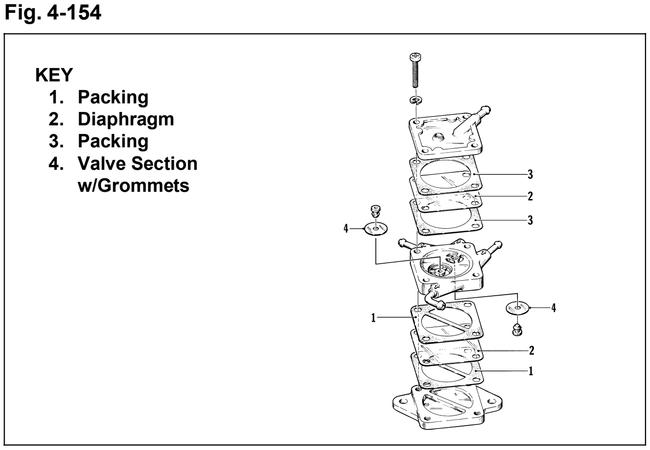
■ **NOTE: Make sure the scribed line made during disassembly is aligned and the tabs on the two lower packings align with the tabs on the bottom and valve section of the pump.**

4. Secure the fuel pump with the screws. Tighten securely.

SERVICING

1. Scribe a line across the fuel pump sections.

Fig. 4-154



0728-279

2. Remove the screws securing the fuel pump; then from the top of the fuel pump, remove the top, packing, diaphragm, packing, valve section, packing, diaphragm, and packing.

■ **NOTE: Be sure all fuel pump components are clean and the fittings are tight.**

3. Push the grommets out of the valve section; then remove the valve from each grommet.

4. Place a valve onto each grommet; then push each valve with grommet into the valve section.

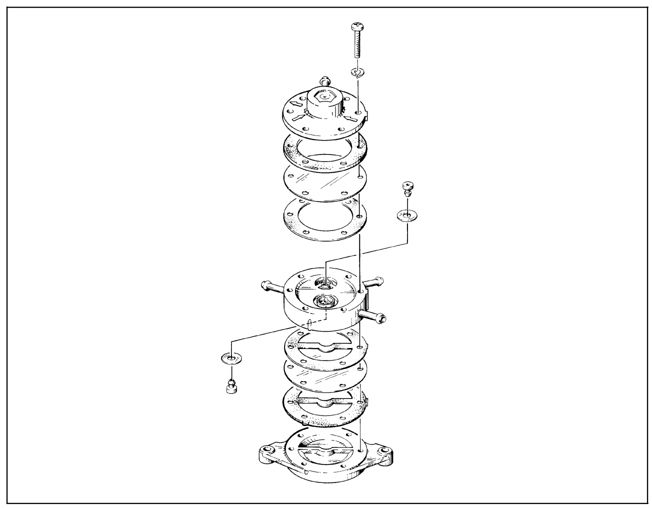
5. In sequence on the bottom of the fuel pump, place a packing, diaphragm, packing, valve section, packing, diaphragm, packing, and top.

■ **NOTE: Make sure the scribed line made during disassembly is aligned.**

6. Secure the fuel pump with the screws. Tighten securely.

SERVICING

Fig. 4-155



730-349N

1. Scribe a line across the fuel pump sections.

2. Remove the screws and lock washers securing the fuel pump; then from the top of the fuel pump, remove the cap, thick packing, diaphragm, thin rubber packing, valve section, thin rubber packing, diaphragm, and thick packing.

3. Push the grommets out of valve section; then remove the valve from each grommet.

■ **NOTE: Be sure all fuel pump components are clean and the fittings are tight.**

4. Place a valve onto each grommet; then push each valve with grommet into the valve section of the fuel pump.

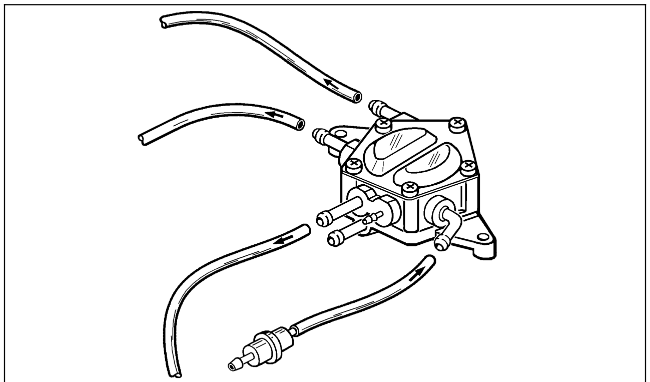
5. In sequence on the bottom of the fuel pump, place a thick packing, diaphragm, thin rubber packing, valve section, thin rubber packing, diaphragm, thick rubber packing, and cap.

■ **NOTE: Make sure the scribed line made during disassembly is aligned and the tabs on the two lower packings align with the tabs on the bottom and valve section of the pump.**

6. Secure the fuel pump with the screws and lock washers. Tighten securely.

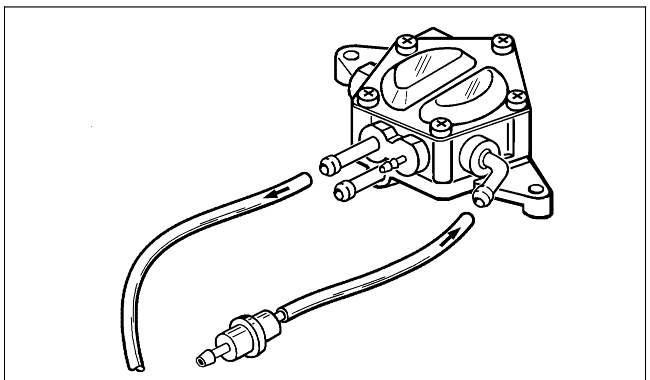
SERVICING

Fig. 4-156



734-292C

Fig. 4-157



734-292D

1. Scribe a line across the fuel pump sections.

2. Remove the Phillips-head screws and lock washers securing the fuel pump sections; then from the top of the fuel pump, remove the cap, gasket, diaphragm, gasket, valve section, gasket, diaphragm, and gasket.

■ **NOTE: Be sure all fuel pump components are clean and the fittings are tight.**

3. Push the grommets out of the valve section; then remove the valve from each grommet.

4. Place a valve onto each grommet; then push each valve with grommet into the valve section of the fuel pump.

5. In sequence on the bottom of the fuel pump, place a gasket, diaphragm, gasket, valve section, gasket, diaphragm, gasket, and cap.

■ **NOTE: Make sure the scribed line made during disassembly is aligned and the tabs on the two upper gaskets align.**

6. Secure the fuel pump with the Phillips-head screws and lock washers. Tighten securely.

Air-Intake Silencer
(One-Piece Style)

The air-intake silencer is a specially designed component used to silence the incoming fresh air and also to catch the fuel that “spits back” out of the carburetors. The carburetors are calibrated with the air-intake silencer in position; therefore, the engine must never be run with the air-intake silencer removed.

CLEANING AND INSPECTING

1. Check for holes or cracks in the silencer.

2. Periodically clean the silencer by blowing fresh air through it.

Air-Intake Silencer
(Cover/Tool Tray Style)

The air-intake silencer is a specially designed component used to silence the incoming fresh air and also to catch the fuel that “spits back” out of the throttle body/carburetors. The throttle body/carburetors are calibrated with the air-intake silencer in position; therefore, the engine must never be run with the air-intake silencer removed.

CLEANING AND INSPECTING

1. Check for holes or cracks in the silencer.

2. Periodically clean the silencer by removing the cover/tool tray assembly and vacuuming the interior of the silencer.

Gas Tank/Seat Assembly

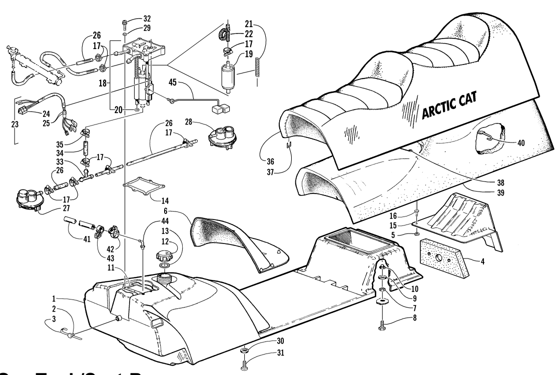
■ **NOTE: Determine which style gas tank/seat assembly is being removed and installed and use the specific sub-section accordingly.**

⚠ WARNING

Whenever any maintenance is performed on the fuel system, there should be no welding, smoking, open flames, etc., in the area.

REMOVING (EFI Models)

Fig. 4-158



KEY

1. Gas Tank/Seat-Base
2. Plug
3. Tape
4. Foam
5. Washer
6. Insert
7. Lock Nut
8. Cap Screw
9. Washer
10. Cap Nut
11. Retaining Ring
12. Cap
13. Seal
14. Gasket
15. Extension
16. Rivet
17. Clamp
18. Fuel Pump Assy
19. Fuel Pump
20. Retaining Ring
21. Spring
22. Hose
23. Harness
24. Connector
25. O-Ring
26. Hose
27. Fuel Pickup
28. Fuel Pickup
29. Washer
30. Washer
31. Self-Tapping Screw
32. Machine Screw
33. T-Fitting
34. Hose
35. Clamp
36. Cover
37. Staple
38. Seat Wire
39. Foam
40. Seat Wire
41. Hose
42. Clamp
43. Clip
44. Vent
45. Float Arm Assy

0735-090

■ **NOTE: If applicable, remove the backrest and rack (see Section 7).**

1. Remove the console (see Section 7).

2. Remove the two cap screws, washers, and lock nuts (located in the rear compartment) securing the seat to the tunnel.

3. Remove the vent hose from the gas tank.

4. Disconnect the wiring harness from the fuel pump.

⚠ CAUTION

Since the fuel supply hose may be under pressure, remove it slowly to release the pressure. Place an absorbent towel around the connection to absorb fuel.

5. Label the fuel hoses "supply" and "return"; then remove the hoses from the fuel pump.

6. Raise the rear of the seat high enough to disconnect the taillight wiring harness; then remove the seat.

INSTALLING (EFI Models)

1. Place the seat in position on the tunnel; then connect the taillight wiring harness.

2. Connect the vent hose to the gas tank.

3. Connect the fuel supply and return hoses to the fuel pump. Secure with clamps.

■ **NOTE: The fuel hoses must be connected to their respective fittings and tightened securely or leakage will result.**

4. Attach the wiring harness to the fuel pump.

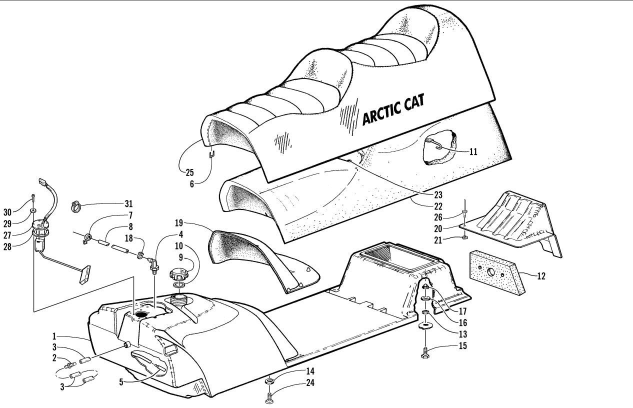
5. Secure the seat to the tunnel with two screws, washers, and lock nuts.

6. Install the console (see Section 7).

■ **NOTE: If applicable, install the backrest and rack (see Section 7).**

REMOVING (Carbureted Models)

Fig. 4-159



KEY

1. Gas Tank/Seat-Base
2. Tank Outlet
3. Hose
4. Vent
5. Strainer
6. Staple
7. Clip
8. Hose
9. Cap
10. Seal
11. Seat Wire
12. Foam
13. Lock Nut
14. Washer
15. Cap Screw
16. Washer
17. Cap Nut
18. Clamp
19. Insert
20. Extension
21. Washer
22. Foam
23. Seat Wire
24. Self-Tapping Screw
25. Cover
26. Rivet
27. Fuel Level Sensor
28. Gasket
29. Washer
30. Machine Screw
31. Clamp

0735-157

■ **NOTE: If applicable, remove the backrest and rack (see Section 7).**

1. Remove the two lock nuts and washers (located in the rear tool compartment) securing the seat to the tunnel.
2. Remove the hose from the gas tank shut-off valve. Plug the hose to prevent drainage.
3. Remove the screws securing the console; then remove the console.

Fig. 4-160



AL142D

4. Slide the gas tank/seat assembly rearward; then remove the vent hose from the gas tank fitting. Disconnect the taillight wiring harness and remove.
5. Drain all gasoline from the tank; then (if necessary) remove the tank outlet assembly and vent fitting.

INSTALLING (Carbureted Models)

1. If removed, apply teflon tape to the threads of the tank outlet fitting and vent fitting; then thread each into the tank.
2. Slide the gas tank/seat assembly into position. Install the vent hose on the vent fitting and connect the gas hose to the shut-off valve.

⚠ CAUTION
Check the vent and gas hoses to be sure they are not kinked or making contact with the driven shaft.

3. Place the gas tank/seat assembly into position, connect the taillight harness, and secure with lock nuts and washers.
4. Install and secure the console.

Fig. 4-161



AL142D

5. Turn the gas tank shut-off valve to the OPEN position.
6. Inspect the entire fuel system for leaks.

■ **NOTE: If applicable, install the backrest and rack (see Section 7).**

SECTION 5 — ENGINE ELECTRICAL SYSTEMS

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5

ELECTRICAL SPECIFICATIONS CHART

MODEL	ENGINE MODEL	IGNITION MANUFACTURER	IGNITION TIMING			SPARK PLUG (NKG)	SPARK PLUG GAP		IGNITION TYPE	LIGHTING COIL OUTPUT @3000 RPM
			Degrees	mm	in.		mm	in.		
Kitty Cat (1999)	AP06A2	Kokusan Denki	20①	1.728	0.068	BR6HS	0.7-0.8	0.028-0.031	OPEN	12V/32W
Bearcat 340 — Panther 340	AG34A8	Kokusan Denki	16①	1.440	0.056	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/185W
Z 370	AA37A2	Kokusan Denki	13①	1.056	0.042	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/185W
Bearcat 440 I, 440 II — Panther 440 — Z 440	AS44A3	Kokusan Denki	18①	2.012	0.079	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/185W
ZL 440	AL44L9	Mitsubishi Denki	18①	1.860	0.073	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/215W
ZL 500 Carb — ZR 500 Carb	AS50L4	Kokusan Denki	24④	3.390	0.133	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/210W
Powder Special 500 EFI — ZL 500 EFI — ZR 500 EFI	AT50L4	Kokusan Denki	24④	3.390	0.133	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/175W
Bearcat Wide Track — Panther 550 — ZL 550	CB55L1	Kokusan Denki	24①	3.540	0.139	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/180W
Pantera 580 EFI — ZL 580 EFI	AB58L4	Kokusan Denki	30②	5.459	0.215	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/175W
Powder Special 600 EFI — ZL 600 EFI — ZR 600 EFI	AD60L4	Kokusan Denki	20⑤	2.371	0.093	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/175W
Powder Special 600 Carb — ZL 600 Carb — ZR 600 Carb	AE60L4	Kokusan Denki	24③	3.390	0.133	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/210W
Triple Touring 600 — ZRT 600	AA60L6	Kokusan Denki	27②	3.884	0.153	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/210W
Powder Special 700 — ZL 700 — ZR 700	AB70L8	Kokusan Denki	27②	4.625	0.182	BR10ES	0.7-0.8	0.028-0.031	OPEN	12V/200W
ZRT 800	AA80L6	Kokusan Denki	12⑥	0.886	0.035	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/185W
Pantera 1000 — Thundercat — Thundercat Mountain Cat	AA10L3	Kokusan Denki	16②	1.556	0.061	BR9EYA	0.7-0.8	0.028-0.031	OPEN	12V/185W

① 6000 RPM - Engine warm
② 4000 RPM
③ 3250 RPM
④ 3500 RPM
⑤ 5000 RPM
⑥ 1800 RPM

RESISTANCE TESTS CHART

ITEM	KOKUSAN									MITSUBISHI
	600 cc - Twin (carbureted)	600 cc EFI	550 cc	800 cc, 1000 cc	500 cc, 580 cc EFI	700 cc	500 cc (carbureted)	600 cc - Triple	340 cc, 370 cc, 440 cc F/C	440 cc L/C
Ignition Coil — Primary	0.092 ± 15% OR ↔ B/W	0.30 ± 15% OR ↔ B	0.30 ± 15% OR ↔ B	0.34 ± 15% POS ↔ NEG	0.30 ± 15% OR ↔ B	0.30 ± 15% OR ↔ B	0.30 ± 15% OR ↔ B	0.34 ± 15% POS ↔ NEG	0.30 ± 15% OR ↔ B	0.092 ± 15% OR ↔ B/W
Ignition Coil — Secondary	4400 ± 20% HT ↔ HT	8500 ± 20% HT ↔ HT	8500 ± 20% HT ↔ HT	7900 ± 20% HT ↔ HT HT ↔ POS	8500 ± 20% HT ↔ HT	8500 ± 20% HT ↔ HT	8500 ± 20% HT ↔ HT	7900 ± 20% HT ↔ HT HT ↔ POS	8500 ± 20% HT ↔ HT	4100 ± 15% HT ↔ HT
Lighting Coil	0.20 ± 20% Y ↔ Y	0.10 ± 20% Y ↔ Y	0.22 ± 20% Y ↔ Y	0.15 ± 20% Y ↔ Y	0.09 ± 20% Y ↔ Y	0.16 ± 20% Y ↔ Y	0.15 ± 20% Y ↔ Y	0.15 ± 20% Y ↔ Y	0.22 ± 20% Y ↔ Y	0.11 ± 10% Y ↔ Y
Magneto Coil (Charge)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	160 ± 20% R/W ↔ B/R	N/A
(Trigger)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(Charge 1)	46 ± 20% G ↔ G	17 ± 20% (low) B/R ↔ G/R	160 ± 20% R/W ↔ B/W	15 ± 20% B/R ↔ G/R	46 ± 20% (high) B ↔ G	17 ± 20% B/R ↔ G/R	46 ± 20% (high) G ↔ B/R	20 ± 20% G ↔ B/R	N/A	1260 ± 10% G ↔ B/W
(Charge 2)	N/A	17 ± 20% (high) G/R ↔ BR/W	17 ± 20% B/R ↔ R/W	15 ± 20% BR/W ↔ G/R	450 ± 20% (low) BR ↔ G	17 ± 20% G/R ↔ BR/W	450 ± 20% (low) G ↔ W	450 ± 20% G ↔ W	N/A	16 ± 10% W/R ↔ B/W
Ignition Timing Sensor	101 ± 20% G/W ↔ BR	190 ± 20% G/W ↔ BR	N/A	101 ± 20% G/W ↔ BR	190 ± 20% (580 cc) G/W ↔ BR	101 ± 20% G/W ↔ BR	101 ± 20% G/W ↔ BR	101 ± 20% G/W ↔ BR	N/A	N/A
Injection Coil	N/A	19 ± 20% BL/W ↔ BL/W	N/A	N/A	21 ± 20% BL ↔ BL	N/A	N/A	N/A	N/A	N/A
Pump Coil	N/A	1.9 ± 20% OR ↔ OR	N/A	N/A	1.8 ± 20% OR ↔ OR	N/A	N/A	N/A	N/A	N/A
Spark Plug Cap	5000 ± 20%	5000 ± 20%	5000 ± 20%	5000 ± 20%	5000 ± 20%	5000 ± 20%	5000 ± 20%	5000 ± 20%	5000 ± 20%	5000 ± 20%

■ **NOTE: EFI Models must use both resistor type spark plugs and spark plug caps.**

Abbreviation:

- B — Black
- BL — Blue
- W — White
- Y — Yellow
- R — Red
- G — Green
- BR — Brown
- GRND — Ground
- N/A — Not Applicable
- OR — Orange
- POS — Positive
- HT — High Tension
- NEG — Negative

Electrical Specifications (340/370/440 cc - Fan Cooled)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections	-
Ignition Coil Primary Secondary	 0.25-0.34 ohm 6800-10,200 ohms	 orange high tension wire	 black high tension wire
Charge Coil	128-192 ohms	red/white	black/red
Lighting Coil	0.17-0.26 ohm	yellow	yellow
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Peak Voltage Output Test (Arctic Cat Ignition Analyzer)**		
RPM	**2000**	**3000**	**4000**
Charge Coil**	205V	192V	185V
CDI	190V	180V	175V
Lighting Coil***	15V	16V	16V
Description	**Test Value**	**+ Test Connections**	**-**
Voltage Regulator	11-13 AC volts @ 2500-2700 RPM	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal

Description	Standard
Ignition Timing* (340 cc)	16° BTDC @ 6000 RPM 1.440 mm (0.056 in.)
Ignition Timing* (370 cc)	13° BTDC @ 6000 RPM 1.056 mm (0.042 in.)
Ignition Timing* (440 cc)	18° BTDC @ 6000 RPM 2.012 mm (0.079 in.)
Lighting Coil Output	12V/185W
Ignition Type	CDI/NOI (Normally Open Ignition)
Spark Plug	NGKBR9EYA
Spark-Plug Gap	0.7-0.8 mm (0.028-0.031 in.)

* Timing to be checked only with the engine at normal operating temperature.
** The voltage reading on the charge coil may be much higher as a large negative spike is sometimes present and may be picked up by the analyzer.
*** Unregulated voltage output.

Electrical Specifications
(440 cc - Liquid Cooled)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	**Resistance Test Test Value**	**+ Test Connections**	**-**
Ignition Coil Primary Secondary	 0.078-0.106 ohm 3485-4715 ohms	 orange high tension wire	 black/white high tension wire
Charge Coil (1)	1134-1386 ohms	green	black/white
Charge Coil (2)	14.31-17.49 ohms	white/red	black/white
Lighting Coil	0.099-0.121 ohm	yellow	yellow
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Peak Voltage Output Test (Arctic Cat Ignition Analyzer)**		
RPM	**2000**	**3000**	**4000**
Charge Coil (1)**	188V	184V	123V
Charge Coil (2)	33V	54V	75V
CDI	176V	173V	163V
Lighting Coil***	15V	19V	21V
Description	**Test Value**	**+ Test Connections**	**-**
Voltage Regulator	11-13 AC volts @ 2500-2700 RPM	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal

Description	**Standard**
Ignition Timing*	18° BTDC @ 6000 RPM 1.860 mm (0.073 in.)
Lighting Coil Output	12V/215W
Ignition Type	CDI/NOI (Normally Open Ignition)
Spark Plug	NGKBR9EYA
Spark-Plug Gap	0.7-0.8 mm (0.028-0.031 in.)

* Timing to be checked only with the engine at normal operating temperature.
** The voltage reading on the charge coil may be much higher as a large negative spike is sometimes present and may be picked up by the analyzer.
*** Unregulated voltage output.

Electrical Specifications (500 cc - Carbureted)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections	-
Ignition Coil Primary Secondary	 0.25-0.34 ohm 6800-10,200 ohms	 orange high tension wire	 black high tension wire
Charge Coil (1)	36.8-55.2 ohms	green	black/red
Charge Coil (2)	360-540 ohms	green	white
Ignition Timing Sensor	80.8-121.2 ohms	green/white	brown
Lighting Coil	0.12-0.18 ohm	yellow	yellow
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Peak Voltage Output Test (Arctic Cat Ignition Analyzer)**		
RPM	**2000**	**3000**	**4000**
Charge Coil (1)*	164V	180V	219V
Charge Coil (2)	160V	172V	211V
CDI	163V	172V	170V
Lighting Coil**	18V	20V	21V
Description	**Test Value**	**+ Test Connections**	**-**
Voltage Regulator	11-13 AC volts @ 2500-2700 RPM	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal

Description	Standard
Ignition Timing	24° BTDC @ 3500 RPM 3.390 mm (0.133 in.)
Lighting Coil Output	12V/210W
Ignition Type	CDI/NOI (Normally Open Ignition)
Spark Plug	NGKBR9EYA
Spark-Plug Gap	0.7-0.8 mm (0.028-0.031 in.)

* The voltage reading on the charge coil may be much higher as a large negative spike is sometimes present and may be picked up by the analyzer.

** Unregulated voltage output.

5

Electrical Specifications
(550 cc)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections	-
Ignition Coil Primary Secondary	 0.25-0.34 ohm 6800-10,200 ohms	 orange high tension wire	 black high tension wire
Charge Coil (1)	128-192 ohms	red/white	black/white
Charge Coil (2)	13.6-20.4 ohms	black/red	red/white
Lighting Coil	0.17-0.26 ohm	yellow	yellow
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Peak Voltage Output Test (Arctic Cat Ignition Analyzer)**		
RPM	**2000**	**3000**	**4000**
Charge Coil (1)	149V	140V	136V
Charge Coil (2)	148V	137V	133V
CDI	138V	132V	129V
Lighting Coil**	18V	19V	19V
Description	**Test Value**	**+ Test Connections**	**-**
Voltage Regulator	11-13 AC volts @ 2500-2700 RPM	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal

Description	Standard
Ignition Timing*	24° BTDC @ 6000 RPM 3.540 mm (0.139 in.)
Lighting Coil Output	12V/180W
Ignition Type	CDI/NOI (Normally Open Ignition)
Spark Plug	NGKBR9EYA
Spark-Plug Gap	0.7-0.8 mm (0.028-0.031 in.)

* Timing to be checked only with the engine at normal operating temperature.
** Unregulated voltage output.

Electrical Specifications (500/580 cc EFI)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections	-
Ignition Coil Primary Secondary	 0.25-0.34 ohm 6800-10,200 ohms	 orange high tension wire	 black high tension wire
Charge Coil (high speed)	36.8-55.2 ohms	black	green
Charge Coil (low speed)	360-540 ohms	brown	green
Lighting Coil	0.07-0.10 ohm	yellow	yellow
Ignition Timing Sensor	152-228 ohms	green/white	brown
Injection Coil	16.8-25.2 ohms	blue	blue
Fuel Pump Coil	1.4-2.1 ohms	orange	orange
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Test Value**	**+ Test Connections**	**-**
Voltage Regulator	11-13 AC volts @ 2500-2700 RPM	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal

Description	Standard
Ignition Timing (500 cc)	24° BTDC @ 3500 RPM 3.390 mm (0.133 in.)
Ignition Timing (580 cc)	30° BTDC @ 4000 RPM 5.459 mm (0.215 in.)
Lighting Coil Output	12V/175W
Ignition Type	CDI/NOI (Normally Open Ignition)
Spark Plug	NGKBR9EYA
Spark-Plug Gap	0.7-0.8 mm (0.028-0.031 in.)

Electrical Specifications (600 cc - Twin Carbureted)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections	-
Ignition Coil Primary Secondary	 0.079-0.105 ohm 3520-5280 ohms	 orange high tension wire	 black/white high tension wire
Charge Coil (1)	36.8-55.2 ohms	green	green
Ignition Timing Sensor	80.8-121.2 ohms	green/white	brown
Lighting Coil	0.16-0.24 ohm	yellow	yellow
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Peak Voltage Output Test (Arctic Cat Ignition Analyzer)**		
RPM	**2000**	**3000**	**4000**
Charge Coil	164V	180V	219V
CDI	163V	172V	170V
Lighting Coil**	18V	20V	21V
Description	**Test Value**	**+ Test Connections**	**-**
Voltage Regulator	11-13 AC volts @ 2500-2700 RPM	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal

Description	Standard
Ignition Timing	24° BTDC @ 3250 RPM 3.390 mm (0.133 in.)
Lighting Coil Output	12V/210W
Ignition Type	CDI/NOI (Normally Open Ignition)
Spark Plug	NGKBR9EYA
Spark-Plug Gap	0.7-0.8 mm (0.028-0.031 in.)

* The voltage reading on the charge coil may be much higher as a large negative spike is sometimes present and may be picked up by the analyzer.

** Unregulated voltage output.

Electrical Specifications
(600 cc EFI)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections	-
Ignition Coil Primary Secondary	 0.25-0.34 ohm 6800-10,200 ohms	 orange high tension wire	 black high tension wire
Charge Coil (high speed)	13.6-20.4 ohms	green/red	brown/white
Charge Coil (low speed)	13.6-20.4 ohms	black/red	green/red
Lighting Coil	0.08-0.12 ohm	yellow	yellow
Ignition Timing Sensor	152-228 ohms	green/white	brown
Injection Coil	15.2-22.8 ohms	blue	blue
Fuel Pump Coil	1.52-2.28 ohms	orange	orange
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Test Value**	**+ Test Connections**	**-**
Voltage Regulator	11-13 AC volts @ 2500-2700 RPM	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal

Description	Standard
Ignition Timing	20° BTDC @ 5000 RPM 2.371 mm (0.093 in.)
Lighting Coil Output	12V/175W
Ignition Type	CDI/NOI (Normally Open Ignition)
Spark Plug	NGKBR9EYA
Spark-Plug Gap	0.7-0.8 mm (0.028-0.031 in.)

Electrical Specifications
(600 cc Triple)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections	-
Ignition Coil Primary Secondary (Dual Lead) (Single Lead)	 0.29-0.39 ohm 6320-9480 ohms 6320-9480 ohms	 positive spade terminal high tension wire high tension wire	 negative spade terminal high tension wire positive spade terminal
Charge Coil (1)	16-24 ohms	green	black/red
Charge Coil (2)	360-540 ohms	green	white
Lighting Coil	0.12-0.18 ohm	yellow	yellow
Ignition Timing Sensor	80.8-121.2 ohms	green/white	brown
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Peak Voltage Output Test (Arctic Cat Ignition Analyzer)**		
RPM	**2000**	**3000**	**4000**
Charge Coil (1)	190V	206V	175V
Charge Coil (2)	104V	142V	152V
CDI	137V	151V	148V
Lighting Coil	17V	20V	21V
Description	**Test Value**	**+ Test Connections**	**-**
Voltage Regulator	11-13 AC volts @ 2500-2700 RPM	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal

Description	Standard
Ignition Timing	27° BTDC @4000 RPM 3.884 mm (0.153 in.)
Lighting Coil Output	12V/210W
Ignition Type	CDI/NOI (Normally Open Ignition)
Spark Plug	NGKBR9EYA
Spark-Plug Gap	0.7-0.8 mm (0.028-0.031 in.)

Electrical Specifications
(700 cc)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections	-
Ignition Coil Primary Secondary	 0.25-0.34 ohm 6800-10,200 ohms	 orange high tension wire	 black high tension wire
Charge Coil (1)	13.6-20.4 ohms	black/red	green/red
Charge Coil (2)	13.6-20.4 ohms	green/red	brown/white
Lighting Coil	0.12-0.19 ohm	yellow	yellow
Ignition Timing Sensor	80.8-121.2 ohms	green/white	brown
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Test Value**	**+ Test Connections**	**-**
Voltage Regulator	11-13 AC volts @ 2500-2700 RPM	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal

Description	Standard
Ignition Timing	27° BTDC @ 4000 RPM 4.625 mm (0.182 in.)
Lighting Coil Output	12V/200W
Ignition Type	CDI/NOI (Normally Open Ignition)
Spark Plug	NGKBR10ES
Spark-Plug Gap	0.7-0.8 mm (0.028-0.031 in.)

Electrical Specifications (800/1000 cc)

■ **NOTE: The ignition system is a Normally Open Ignition (NOI).**

Description	Resistance Test Test Value	+ Test Connections	-
Ignition Coil Primary Secondary (Dual Lead) (Single Lead)	 0.29-0.39 ohm 6320-9480 ohms 6320-9480 ohms	 positive spade terminal high tension wire high tension wire	 negative spade terminal high tension wire positive spade terminal
Charge Coil (1)	12-18 ohms	black/red	green/red
Charge Coil (2)	12-18 ohms	brown/white	green/red
Lighting Coil	0.12-0.18 ohm	yellow	yellow
Ignition Timing Sensor	80.8-121.2 ohms	green/white	brown
Spark-Plug Cap	4000-6000 ohms	cap end	cap end
Description	**Peak Voltage Output Test (Arctic Cat Ignition Analyzer)**		
RPM	**2000**	**3000**	**4000**
Charge Coil (1)	142V	164V	167V
Charge Coil (2)	210V	246V	253V
CDI	145V	154V	153V
Lighting Coil	17V	20V	21V
Description	**Test Value**	**+ Test Connections**	**-**
Voltage Regulator	11-13 AC volts @ 2500-2700 RPM	yellow	brown
Low Oil-Light Sending Unit	Less than 1 ohm (float end down)	terminal	terminal
High Temperature Sensor	Open (water temperature lower than 190°F)	terminal	ground
	Up to 20 ohms (water temperature higher than 230°F)	terminal	ground
High Temperature Warning Light	Less than 10 ohms	terminal	terminal
Ignition Switch	Less than 1 ohm (key in OFF position)	terminal	terminal

Description	Standard
Ignition Timing (800 cc)	12° BTDC @ 1800 RPM 0.886 mm (0.035 in.)
Ignition Timing (1000 cc)	16° BTDC @ 4000 RPM 1.556 mm (0.061 in.)
Lighting Coil Output	12V/185W
Ignition Type	CDI/NOI (Normally Open Ignition)
Spark Plug	NGKBR9EYA
Spark-Plug Gap	0.7-0.8 mm (0.028-0.031 in.)

Testing Electrical Components

All tests of the engine electrical components should be made using either the digital Fluke Model 73 Multimeter (p/n 0644-191) or the analog Multitester (p/n 0644-033). Replace any component that does not have a test value within specifications.

■ **NOTE: Whenever using a digital-style tester, "open (infinite resistance)" denotes an overload and the meter reading will be OL since the meter is not calibrated to register resistance values of that magnitude.**

■ **NOTE: Whenever using an analog-style tester, "open (infinite resistance)" denotes ohm count too high to register, and the meter reading indicator will remain stationary at the ∞ (infinity) position.**

■ **NOTE: Whenever testing switches, less than 1 ohm is desirable with the switch in the activated position.**

Troubleshooting Ignition System (EFI Models)

When troubleshooting the standard "normally open" ignition system, use the following procedure.

1. Remove the spark plugs and visually check their condition. Replace any fouled plug. Attach the spark plugs to the high tension leads and ground them on the cylinder heads.

⚠ CAUTION

Before checking for spark, place all the engine switches in the deactivated position. In the event the engine could be flooded, pull the starter rope (slowly at first) several times to clear the engine of excess fuel.

⚠ CAUTION

Never crank the engine over without grounding the spark plugs. Damage to coils and/or CDI unit may result.

■ **NOTE: Make sure the ignition switch and the emergency stop switch are in the ON position.**

2. Crank the engine over and check for spark. If no spark is present, check to make sure the throttle cable is properly tensioned. Compress the throttle control and while holding the throttle control in this position, crank the engine over and check for spark. If spark is now present, adjust the throttle cable tension.

3. If no spark is present, disconnect the main wiring harness from the engine. Crank the engine over. If spark is present, the problem is either one or more of the following:

   a. Defective emergency stop switch

   b. Defective safety switch in throttle-control housing

   c. Corroded or loose wire connection at the throttle-control housing or main wiring harness

   d. Defective ignition switch

   e. Fouled spark plugs

   f. Defective charge coil (high speed and low speed)

   g. Defective ignition timing sensor

   h. Defective ECU or loose or corroded connection in wiring harness

■ **NOTE: To check these possible causes, proceed to Testing Ignition System.**

5

Testing Ignition System (EFI Models)

■ **NOTE: There must be free-play between the throttle lever and the control housing.**

MAIN WIRING AND SAFETY SWITCHES

1. Check the wiring connections coming from the ignition key and emergency stop switches. The throttle control switch connector is located on the front side of the steering post. If any of the connections appear dirty or corroded, clean them with fine sandpaper and compressed air; then connect all wires and squeeze the connections with a pliers for additional tightness.

2. Disconnect the main wiring harness connector coming from the engine stator assembly. Disconnecting this connector will bypass the main wiring harness and all switches which will not allow the engine to be shut off without first installing an additional auxiliary ground wire.

3. Insert an auxiliary ground wire into the black wire of the four-wire main harness connector on the engine side. To stop the engine once it has been started, touch the auxiliary ground wire to the engine.

4. Support the rear of the snowmobile up on a shielded safety stand; then set the brake lever lock. Inspect the complete throttle mechanism to assure that it's working properly.

5. Attempt to start the engine. To stop the engine (if the engine starts), touch the auxiliary ground wire installed into the four-wire connector to a ground on the engine. If the engine fails to start, the problem is with the coils mounted on the engine, high tension coil assembly, or the ECU. If the engine starts, the problem is with the switches, main wiring harness, or throttle cable free-play.

IGNITION KEY SWITCH

1. Disconnect the ignition key switch connectors; then connect the ohmmeter leads to each of the ignition key switch terminals.

2. With the switch in the OFF position, the meter must read less than 1 ohm of resistance.

3. With the switch in the ON position, the meter must read OL (infinite resistance).

THROTTLE CONTROL SWITCH

1. Verify that the throttle cable has free-play between the throttle lever and control housing.

2. Disconnect the throttle control switch connector; then connect one ohmmeter lead to the brown wire and the other lead to the black/white wire of the emergency stop switch.

3. With the throttle lever in the idle position and the emergency stop knob in the up (RUN) position, the meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

4. With the throttle lever in the idle position and the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch. With the emergency stop knob still in the down (STOP) position, move the throttle lever to the wide open position. The meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

5. Connect one ohmmeter lead to the brown wire and the other lead to the violet wire. With the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch. With the emergency stop knob in the up (RUN) position, the meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

Troubleshooting Ignition System
(Fan Cooled Models)

When troubleshooting the standard "normally open" ignition system, use the following procedure.

1. Remove the spark plugs and visually check their condition. Replace any fouled plug. Attach the spark plugs to the high tension leads and ground them on the cylinder heads.

⚠ CAUTION

Before checking for spark, place all the engine switches in the deactivated position. In the event the engine could be flooded, pull the starter rope (slowly at first) several times to clear the engine of excess fuel.

⚠ CAUTION

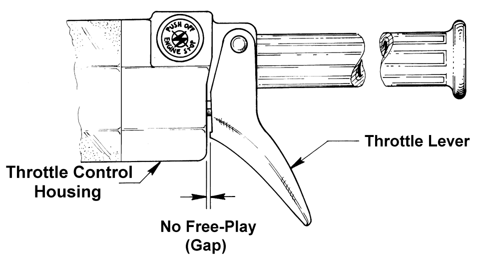
Never crank the engine over without grounding the spark plugs. Damage to coils and/or CDI unit may result.

■ **NOTE: Make sure the ignition switch and the emergency stop switch are in the ON position.**

2. Crank the engine over and check for spark. If no spark is present, check to make sure the throttle cable is properly tensioned. Compress the throttle control and while holding the throttle control in this position, crank the engine over and check for spark. If spark is now present, adjust the throttle cable tension.

■ **NOTE: On the models equipped with a 2-wire throttle control switch connector, there must be no free-play between the lever and the control housing.**

Fig. 5-1

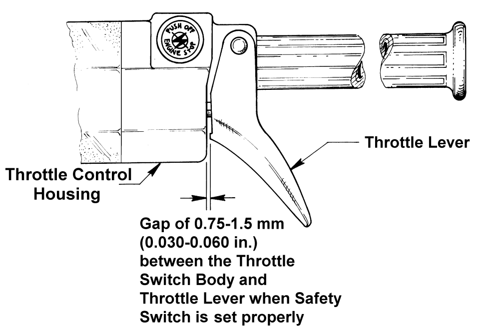


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■ **NOTE: If cable free-play gap is apparent, rotate the swivel adapter until no free-play is achieved. The piston valve must be resting against the tip of its idle speed screw.**

■ **NOTE: On the models equipped with a 3-wire throttle control switch connector, there must be 0.75-1.5 mm (0.030-0.060 in.) free-play between the lever and the control housing.**

Fig. 5-2



733-081C

3. If no spark is present, disconnect the main wiring harness from the engine. Crank the engine over. If spark is present, the problem is either one or more of the following.

    a. Defective emergency stop switch

    b. Defective safety switch in throttle-control housing

    c. Grounded or shorted wire connection at the throttle-control housing or main wiring harness

    d. Defective ignition switch

■ **NOTE: To check these possible causes, proceed to Testing Ignition System. If no spark is present, proceed to Arctic Cat Ignition Analyzer in this section.**

Testing Ignition System
(Single Carburetor F/C Models)

■ **NOTE: The throttle control is equipped with a two-wire throttle control switch connector. There must be no throttle cable free-play between the throttle lever and the control housing.**

MAIN WIRING AND SAFETY SWITCHES

1. Check the wiring connections coming from the ignition key and throttle control switches. The two-wire throttle control switch connector is located on the front side of the steering post. If any of the connections appear dirty or corroded, clean them with fine sandpaper and compressed air; then connect all wires and squeeze the connections with a pliers for additional tightness.

2. Disconnect the main wiring harness four-wire connector coming from the engine stator assembly. Disconnecting the connector will bypass the main wiring harness and all switches which will not allow the engine to be shut off without first installing an additional auxiliary ground wire.

3. Insert an auxiliary ground wire into the black wire of the four-wire main harness connector on the engine side. To stop the engine once it has been started, touch the auxiliary ground wire to the engine.

4. Support the rear of the snowmobile up on a shielded safety stand; then set the brake lever lock. Inspect the complete throttle mechanism to assure that it's working properly.

5. Attempt to start the engine. To stop the engine (if the engine starts), touch the auxiliary ground wire installed into the four-wire connector to a ground on the engine. If the engine fails to start, the problem is with the coils mounted on the engine, high tension coil assembly, or the CDI unit. If the engine starts, the problem is with the switches, main wiring harness, or throttle cable free-play.

■ **NOTE: Whenever working with a two-wire throttle control switch connector, the throttle cable must have no free-play when measured between the throttle lever and control housing.**

MAIN HARNESS

1. Disconnect the main wiring harness four-wire connector coming from the engine stator assembly. Connect one ohmmeter lead to the violet wire and the other lead to the brown wire on the chassis side of the main wiring harness four-wire connector. With all switches in the RUN position, the meter must read no resistance (open).

2. If the meter reads resistance (closed), test the Ignition Key Switch and Throttle Control Switch independently of each other.

IGNITION KEY SWITCH

1. Disconnect the ignition key switch connectors; then connect the ohmmeter leads to each of the ignition key switch terminals.

2. With the key switch in the OFF position, the meter must read resistance (closed). If the meter reads no resistance (open), the switch must be replaced.

THROTTLE CONTROL SWITCH

■ NOTE: The throttle control has a two-wire wiring harness connector located on the front side of the steering post. Whenever working with a two-wire throttle control switch, the throttle cable must be adjusted so there is no free-play between the throttle lever and control housing.

1. Verify that the throttle cable has no free-play between the throttle lever and control housing.

2. Disconnect the two-wire throttle control switch connector; then connect the ohmmeter leads to each of the switch wires.

3. With the throttle lever in the idle position and the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch.

4. Depress the throttle lever with the emergency stop knob in the up (RUN) position. The meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

5. With the throttle lever depressed and the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch.

Testing Ignition System
(Twin Carburetor F/C Models)

■ NOTE: The throttle control is equipped with a 3-prong emergency stop switch connector. There must be 0.75-1.5 mm (0.030-0.060 in.) free-play between the lever and the control housing (see Section 4-Adjusting Carburetors).

MAIN WIRING AND SAFETY SWITCHES

1. Check the wire connections at the ignition key switch and at the emergency stop switch. This connector is located on the front side of the steering post. If any of the connections appear dirty or corroded, clean with fine sandpaper and compressed air; then connect all wires and squeeze connections with a pliers for added tightness.

2. Disconnect the main wiring harness connector coming from the engine. Using an ohmmeter, connect one lead to the black wire in the connector of the main harness. Connect the remaining ohmmeter lead to the brown wire in the connector of the main harness.

3. With all switches in the RUN position, the meter must read resistance (closed). If the meter reads no resistance (open), proceed to testing Emergency Stop/Throttle Switch, Carburetor Safety Switches, and Ignition Key Switch.

EMERGENCY STOP/ THROTTLE SWITCH

1. If the meter read no resistance (open) in the previous test, locate the wiring harness coming from the emergency stop/throttle switch assembly.

2. Disconnect the 3-wire connector. Using an ohmmeter, connect one meter lead to the black wire and the other meter lead to the black/red wire in the connector.

3. With the emergency stop knob, located on top of the throttle control, in the ON (pulled up) position and the throttle lever compressed, the meter must read resistance (closed).

4. If the meter reads no resistance (open) and the lever/control housing free-play is correct, replace the throttle switch.

5. If the meter reads resistance (closed) but the engine will not start, with the ohmmeter leads still connected, alternately release and compress the throttle lever; then move the emergency stop knob down and up.

6. The meter must read no resistance (open) when the throttle lever is released and the emergency stop knob is in either the UP or the DOWN position.

7. If the meter reads resistance (closed), replace the throttle switch.

8. Connect one meter lead to the black/red wire and the other meter lead to the black/white wire.

9. With the throttle lever released (idle position) and the emergency stop knob in the DOWN position, the meter must read no resistance (open).

10. If above tests were good, proceed to testing Carburetor Safety Switches and Ignition Key Switch.

CARBURETOR SAFETY SWITCHES (Twin)

1. If the meter read no resistance (open) in the previous test, disconnect the carburetor safety switches one at time and test for a closed circuit.

2. Attach the two ohmmeter leads to the two leads coming from each carburetor switch. The meter must read resistance (closed).

3. If the meter reads no resistance (open), the switch must either be adjusted or replaced (see Synchronizing Carburetor Safety Switches in this sub-section). If the meter reads resistance (closed), proceed to testing Ignition Key Switch.

IGNITION KEY SWITCH

1. If the meter read resistance (closed) in the previous test, disconnect the ignition key switch connectors and connect the ohmmeter leads to each of the leads from the switch.

2. With the key switch in the OFF position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch.

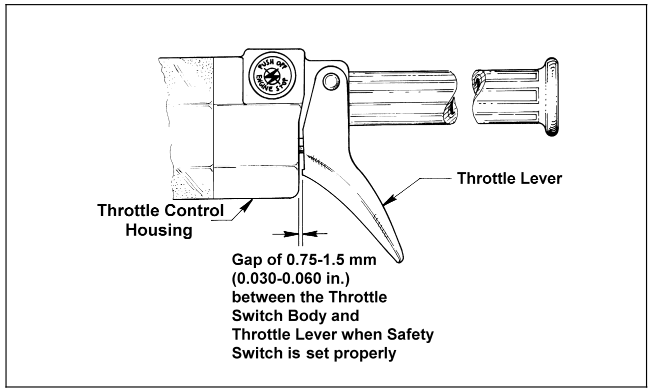
SYNCHRONIZING CARBURETOR SAFETY SWITCHES (Twin)

Before synchronizing the carburetor safety switches, check to make certain the carburetor idle speed screws are adjusted equally and the piston valves are synchronized. The carburetor safety switches affect ignition spark at idle only. If ignition spark problems are observed at partial or full-throttle positions, the problem is not with the carburetor safety switches.

■ **NOTE: The throttle control is equipped with a 3-wire throttle control switch connector. There must be 0.75-1.5 mm (0.030-0.060 in.) free-play between the lever and the control housing.**

1. Inspect the cable free-play gap between the throttle lever and the control housing at idle. Adjust the throttle cable swivel adapter at the top of each carburetor for 0.75-1.5 mm (0.030-0.060 in.) cable free-play gap between the throttle lever "nibs" and the control housing. While observing if there is any cable free-play gap, apply slight pressure to the throttle lever to take up any cable slack that may be present. However, do not apply enough pressure to actually raise the carburetor slides during this adjustment. After cable free-play is properly adjusted, tighten the jam nut on each carburetor securely.

Fig. 5-3



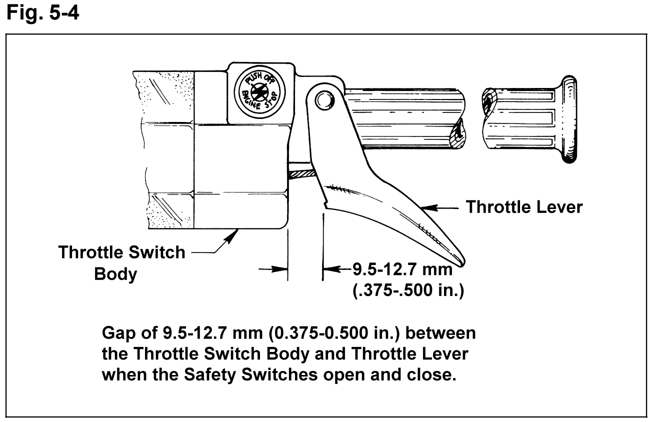
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2. To determine which switch needs adjusting, disconnect both carburetor safety switches from the main wiring harness connector.

3. Connect a digital ohmmeter to one carburetor safety switch connector; then compress the throttle lever while observing the meter reading and measure the gap between the throttle lever and control housing at the moment the meter reading changes from open to closed. Repeat this step for the other carburetor safety switch.

■ **NOTE: The correct throttle lever/housing gap should be in a range of 9.5 - 12.7 mm (0.375-0.500 in.) the moment the meter reading changes from open to closed. A switch that changes from open to closed before the other one is the switch that must be raised to attain safety switch synchronization.**

Fig. 5-4



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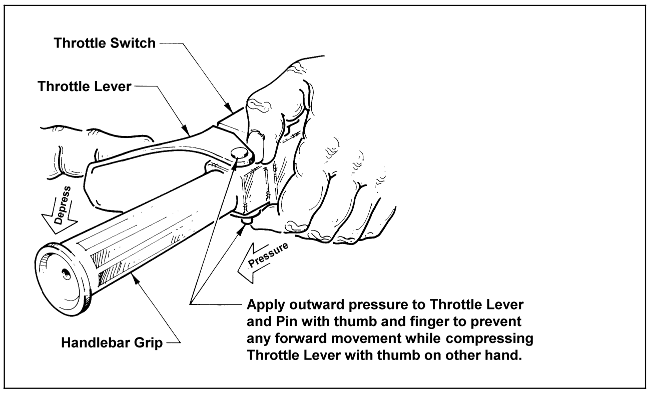
4. If an adjustment is necessary, loosen the switch bracket screws, move the switch up, tighten the screws, and then reset using step 3.

■ NOTE: After completion of any adjustments, throttle lever "side pressure" should not cause an ignition miss at idle. Carburetor switches set too low or an excessively tight throttle cable makes the shutdown system very sensitive to throttle lever "side pressure" near idle. To test carburetor safety switch synchronization, follow steps 5-9.

5. Reconnect the carburetor safety switch connectors. Place the rear of the snowmobile on a shielded safety stand; then start the engine and allow it to warm up for 3-4 minutes.

6. Hold both the top and bottom of the throttle lever pin so that depression of the throttle lever does not move the lever pin in its control slot.

Fig. 5-5



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7. Slowly depress the throttle lever to increase engine RPM.

■ NOTE: It is very important that engine RPM be allowed to increase slowly, since most engines have a "rich area" at approximately 2500 RPM.

8. Observe the tachometer and the drive clutch to determine the moment the carburetor safety switches shut down the ignition. Since retaining the throttle lever pin prevents the switch in the throttle control housing from closing, the carburetor safety switches should shut down the ignition at or slightly after clutch engagement.

9. Repeat steps 6-8 several times. If ignition shutdown always occurs at or slightly after clutch engagement, the carburetor safety switches are synchronized.

10. Again, inspect the gap between the throttle lever and the control housing at idle. Adjust the throttle cable swivel adapter at the top of each carburetor for 0.75-1.5 mm (0.030-0.060 in.) cable free-play gap between the throttle lever "nibs" and the control housing. While observing if there is any cable free-play gap, apply slight pressure to the throttle lever to take up any cable slack that may be present. However, do not apply enough pressure to actually raise the carburetor slides during this adjustment. After cable free-play is properly adjusted, tighten the jam nut on each carburetor securely.

■ NOTE: After completion of any adjustments, throttle lever "side pressure" should not cause an ignition miss at idle. Carburetor safety switches set too low or an excessively tight throttle cable makes the shutdown system very sensitive to throttle lever "side pressure" near idle.

Troubleshooting Ignition System
(Twin & Triple L/C Models)

When troubleshooting the standard "normally open" ignition system, use the following procedure.

1. Remove the spark plugs and visually check their condition. Replace any fouled plug. Attach the spark plugs to the high tension leads and ground them on the cylinder heads.

⚠ CAUTION

Before checking for spark, place all the engine switches in the deactivated position. In the event the engine could be flooded, pull the starter rope (slowly at first) several times to clear the engine of excess fuel.

⚠ CAUTION

Never crank the engine over without grounding the spark plugs. Damage to coils and/or CDI unit may result.

■ NOTE: Make sure the ignition switch and the emergency stop switch are in the ON position.

2. Crank the engine over and check for spark. If no spark is present, check to make sure the carburetor throttle cables are properly tensioned. Compress the throttle control and while holding the throttle control in this position, crank the engine over and check for spark. If spark is now present, adjust the carburetor throttle cable tension.

3. If no spark is present, disconnect the main wiring harness from the engine. Crank the engine over. If spark is present, the problem is either one or more of the following:

   a. Defective emergency stop switch

   b. Defective safety switch in throttle-control handle

   c. Corroded or loose wire connection at the throttle-control housing or main wiring harness

   d. Defective ignition switch

■ **NOTE: To check these possible causes, proceed to Testing Ignition System. If no spark is present, proceed to Arctic Cat Ignition Analyzer in this section.**

Testing Ignition System
(Twin & Triple L/C Models)

■ **NOTE: There must be 0.75-1.5 mm (0.030-0.060 in.) throttle cable free-play (on the VM-style carburetor models) or no free-play (on the TM-style carburetor models) between the throttle lever and the control housing.**

MAIN WIRING AND SAFETY SWITCHES

1. Check the wiring connections coming from the ignition key, emergency stop, and carburetor switches (on VM-style). The throttle control switch connector is located on the front side of the steering post. If any of the connections appear dirty or corroded, clean them with fine sandpaper and compressed air; then connect all wires and squeeze the connections with a pliers for additional tightness.

2. Disconnect the main wiring harness connector coming from the engine stator assembly. Disconnecting this connector will bypass the main wiring harness and all switches which will not allow the engine to be shut off without first installing an additional auxiliary ground wire.

3. Insert an auxiliary ground wire into the black wire of the main harness connector on the engine side. To stop the engine once it has been started, touch the auxiliary ground wire to the engine.

4. Support the rear of the snowmobile up on a shielded safety stand; then set the brake lever lock. Inspect the complete throttle mechanism to assure that it's working properly.

5. Attempt to start the engine. To stop the engine (if the engine starts), touch the auxiliary ground wire installed into the connector to a ground on the engine. If the engine fails to start, the problem is with the coils mounted on the engine, high tension coil assembly, or the CDI unit. If the engine starts, the problem is with the switches, main wiring harness, or throttle cable free-play.

MAIN HARNESS

1. Disconnect the main wiring harness connector coming from the engine stator assembly. Connect one ohmmeter lead to the violet wire and the other lead to the brown wire on the chassis side of the main wiring harness four-wire connector. With all switches in the RUN position, the meter must read no resistance (open).

2. If the meter reads resistance (closed), test the Ignition Key Switch, Throttle Control Switch, and Carburetor Safety Switches independently of each other.

IGNITION KEY SWITCH

1. Disconnect the ignition key switch connectors; then connect the ohmmeter leads to each of the ignition key switch terminals.

2. With the switch in the OFF position, the meter must read less than 1 ohm resistance.

3. With the switch in the ON position, the meter must read OL (infinite resistance).

THROTTLE CONTROL SWITCH

1. Verify that the throttle cable has 0.75-1.5 mm (0.030-0.060 in.) free-play (VM-style carburetor models) or no free-play (TM-style carburetor models) between the throttle lever and control housing.

2. Disconnect the throttle control switch connector; then connect one ohmmeter lead to the brown wire and the other lead to the black/white wire of the emergency stop switch.

3. With the throttle lever in the idle position and the emergency stop knob in the up (RUN) position, the meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

4. With the throttle lever in the idle position and the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch. With the emergency stop knob still in the down (STOP) position, move the throttle lever to the wide open position. The meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

5. Connect one ohmmeter lead to the brown wire and the other lead to the violet wire. With the emergency stop knob in the down (STOP) position, the meter must read resistance (closed). If the meter reads no resistance (open), replace the switch. With the emergency stop knob in the up (RUN) position, the meter must read no resistance (open). If the meter reads resistance (closed), replace the switch.

CARBURETOR SAFETY SWITCHES (VM-Style)

1. Disconnect both carburetor safety switches at the carburetors from the main wiring harness.

2. Connect the ohmmeter leads to one of the carburetor safety switches. With the throttle lever in the idle position, the ohmmeter must read no resistance (open). If the meter reads resistance (closed), adjust the switch (see Synchronizing Carburetor Safety Switches in this sub-section). Test the remaining switch.

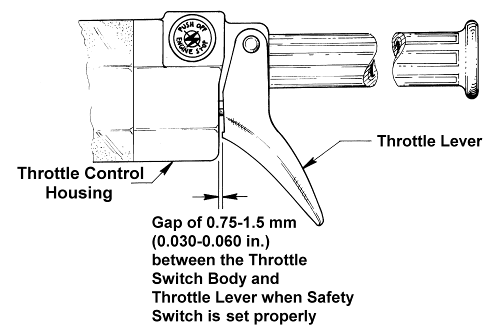
SYNCHRONIZING CARBURETOR SAFETY SWITCHES (VM-Style)

Before synchronizing the carburetor safety switches, check to make certain the carburetor idle speed screws are adjusted equally and the throttle valves are synchronized. The carburetor safety switches affect ignition spark at idle only. If ignition spark problems are observed at partial or full-throttle positions, the problem is not with the carburetor safety switches.

■ **NOTE: The throttle control is equipped with a 3-wire throttle control switch connector. There must be 0.75-1.5 mm (0.030-0.060 in.) free-play between the lever and the control housing.**

1. Inspect the cable free-play gap between the throttle lever and the control housing at idle. Adjust the throttle cable swivel adapter at the top of each carburetor for 0.75-1.5 mm (0.030-0.060 in.) cable free-play gap between the throttle lever "nibs" and the control housing. While observing if there is any cable free-play gap, apply slight pressure to the throttle lever to take up any cable slack that may be present. However, do not apply enough pressure to actually raise the carburetor slides during this adjustment. After cable free-play is properly adjusted, tighten the jam nut on each carburetor securely.

Fig. 5-6



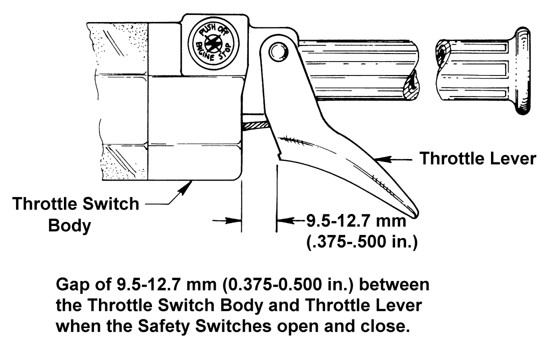
733-081c

2. To determine which switch needs adjusting, disconnect both carburetor safety switches from the main wiring harness connector.

3. Connect a digital ohmmeter to one carburetor safety switch connector; then compress the throttle lever while observing the meter reading and measure the gap between the throttle lever and control housing at the moment the meter reading changes from open to closed. Repeat this step for the other carburetor safety switch.

■ **NOTE: The correct throttle lever/housing gap should be in a range of 9.5 - 12.7 mm (0.375-0.500 in.) the moment the meter reading changes from open to closed. A switch that changes from open to closed before the other one is the switch that must be raised to attain safety switch synchronization.**

Fig. 5-7



733-082A

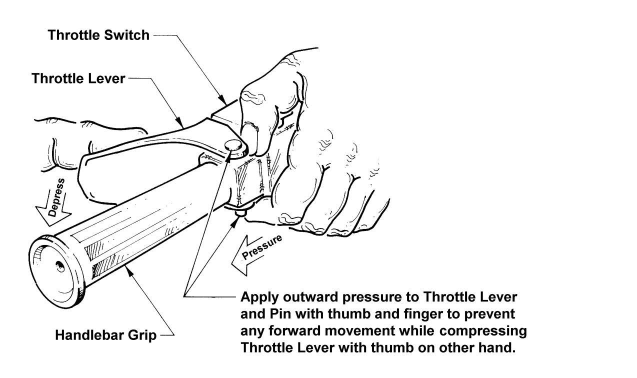
4. If an adjustment is necessary, loosen the switch bracket screws, move the switch up, tighten the screws, and then reset using step 3.

■ **NOTE: After completion of any adjustments, throttle lever "side pressure" should not cause an ignition miss at idle. Carburetor switches set too low or an excessively tight throttle cable makes the shutdown system very sensitive to throttle lever "side pressure" near idle. To test carburetor safety switch synchronization, follow steps 5-9.**

5. Reconnect the carburetor safety switch connectors. Place the rear of the snowmobile on a shielded safety stand; then start the engine and allow it to warm up for 3-4 minutes.

6. Hold both the top and bottom of the throttle lever pin so that depression of the throttle lever does not move the lever pin in its control slot.

Fig. 5-8



0728-916

7. Slowly depress the throttle lever to increase engine RPM.

■ **NOTE: It is very important that engine RPM be allowed to increase slowly, since most engines have a "rich area" at approximately 2500 RPM.**

8. Observe the tachometer and the drive clutch to determine the moment the carburetor safety switches shut down the ignition. Since retaining the throttle lever pin prevents the switch in the throttle control housing from closing, the carburetor safety switches should shut down the ignition at or slightly after clutch engagement.

9. Repeat steps 6-8 several times. If ignition shutdown always occurs at or slightly after clutch engagement, the carburetor safety switches are synchronized.

10. Again, inspect the gap between the throttle lever and the control housing at idle. Adjust the throttle cable swivel adapter at the top of each carburetor for 0.75-1.5 mm (0.030-0.060 in.) cable free-play gap between the throttle lever "nibs" and the control housing. While observing if there is any cable free-play gap, apply slight pressure to the throttle lever to take up any cable slack that may be present. However, do not apply enough pressure to actually raise the carburetor slides during this adjustment. After cable free-play is properly adjusted, tighten the jam nut on each carburetor securely.

■ **NOTE: After completion of any adjustments, throttle lever "side pressure" should not cause an ignition miss at idle. Carburetor safety switches set too low or an excessively tight throttle cable makes the shutdown system very sensitive to throttle lever "side pressure" near idle.**

Digital 3-D Ignition (700/800/1000 cc)

The advantage of a 3-D ignition system is it actually has up to twelve slightly different timing curves which are controlled by both throttle position and engine RPM. This sytem allows the technician to match a more safe timing curve to each engine operating condition.

A condition in which the 3-D ignition will have a distinct advantage is when the operator completes high-speed operation and backs the throttle position off slightly to cruise. Since the engine now may still be at fairly high RPM, it is running at less throttle opening. This condition can create a higher engine operating temperature because of the slightly leaner jet needle position. With the 3-D ignition as soon as the throttle position is backed off, the ignition timing will be reduced and engine temperature also will be reduced.

When checking the ignition timing, a couple points must be remembered. First, since the ignition timing is affected by the throttle position, the throttle position sensor (TPS) must be in good operating condition and adjusted correctly. Second, the ignition timing must be checked according to the following chart. Never remove the drive belt to make the timing check. Always place the rear of the snowmobile on a shielded safety stand and allow the track to rotate freely.

Engine	RPM	Ignition Timing ± 2°	Fail-Safe Timing ± 2°
700 cc	4000	27°	15°
800 cc	1800	12°	N/A
1000 cc	4000	16°	14°

When checking ignition timing, it is important that the timing light be connected to the number 1 spark plug wire, which is the MAG-side cylinder. If the number 2 cylinder spark plug wire is used, the timing light may show a 2° error in ignition timing when ignition timing is actually correct.

For example, the correct ignition timing on the 700 cc is 27° ± 2° BTDC at 4000 RPM.

If ignition timing is at 15° BTDC at 4000 RPM, the throttle position sensor (TPS) has failed and must be replaced. This is known as "Fail-Safe Ignition Timing" and is built into the system to protect the engine should the TPS fail.

If the ignition timing isn't 27° ± 2° at 4000 RPM, the TPS should be checked for proper adjustment using the TPS Adjustment Tool (p/n 0644-299). To adjust the TPS, use the following procedure.

5

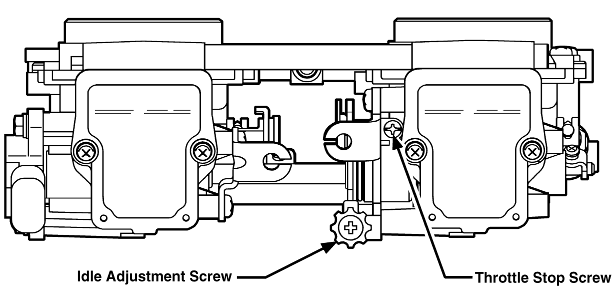
ADJUSTING TPS

■ NOTE: Before using the TPS adjustment tool, verify its battery condition. The battery used in the tool is a 9-volt battery.

To check battery condition, use a digital volt/ohmmeter set on DC volt scale. Test between the adjustment tool black and red jacks. Insert the red lead of the digital voltmeter into the green jack of the adjustment tool and the black lead of the digital voltmeter into the black jack of the adjustment tool. If voltage is found below 4.9 volts, replace the battery.

1. Loosen the two screws securing the TPS.
2. Using TPS Adjustment Tool (p/n 0644-299), connect its wiring harness to the TPS. Connect the two meter leads (red and black) using the two pin jack adapters provided with the adjustment tool to the red and black jacks of the TPS adjustment tool.
3. Set the selector to the DC scale. Adjust the TPS to the specifications in the following chart with the throttle fully closed; then tighten the two screws securing the TPS.
4. Squeeze the throttle to the wide-open position. If the reading is not as specified in the following chart, adjust the throttle stop screw until the correct voltage is indicated on the voltmeter.

Fig. 5-9



0734-457

5. Connect the throttle cable to the throttle shaft. Adjust the throttle cable, if required, so that both the idle and wide-open positions are obtainable while working the throttle lever. Keep in mind that there must be no free-play in the throttle lever in the idle position.
6. Check the idle voltage using the TPS Adjustment Tool (p/n 0644-299). Adjust the idle voltage to the specifications in the following chart using the idle adjustment screw.
7. Disconnect the adjustment tool harness from the TPS. Connect the snowmobile TPS harness to the newly installed or adjusted TPS.

■ NOTE: Before installing the TPS harness connector, apply dielectric grease to the connector pins.

Engine	Closed Position	Idle Position	Wide-Open Position
700 cc	0.025 V	0.325 V	3.920 V
800 cc	0.300 V	0.600 V	4.012 V
1000 cc	0.300 V	0.600 V	4.012 V

REPLACING TPS

1. Disconnect the throttle cable from the throttle shaft.
2. Turn the idle speed screw counterclockwise until its end no longer contacts the throttle stop. The throttle valves should now be completely closed.
3. Disconnect the TPS wiring harness connector. Remove the two screws securing the TPS to the right-side carburetor.
4. Install the new TPS and secure with two screws, flat washers, and lock washers.

FAIL-SAFE IGNITION TIMING

Engines equipped with the 3-D ignition system have a protective feature called “fail-safe” ignition timing which prevents engine damage should the TPS fail. If the TPS does fail, the engine will run normally at low RPM but will run poorly at high RPM. This will allow the operator to get the snowmobile to safety with little or no engine damage.

■ NOTE: The engine will continue to operate this way until the TPS is replaced.

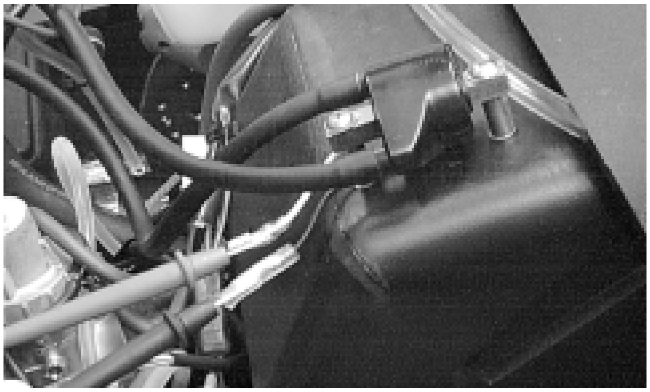
Testing Electrical Resistances
(EFI Models)

■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

IGNITION COIL (PRIMARY)

1. Disconnect the double wire plug from the ECU to the ignition coil.
2. Set the selector in the X1 position.
3. Connect the red meter lead to the orange lead; then connect the black meter lead to the black lead.

Fig. 5-10



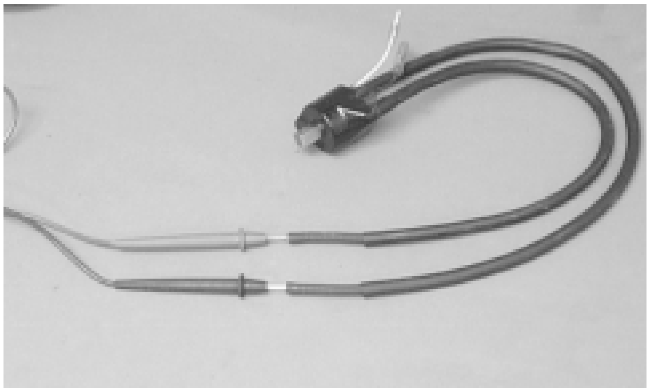
AK051D

4. Ignition coil primary resistance must be between 0.25-0.34 ohm.

IGNITION COIL (SECONDARY)

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the X1K position.
3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

Fig. 5-11



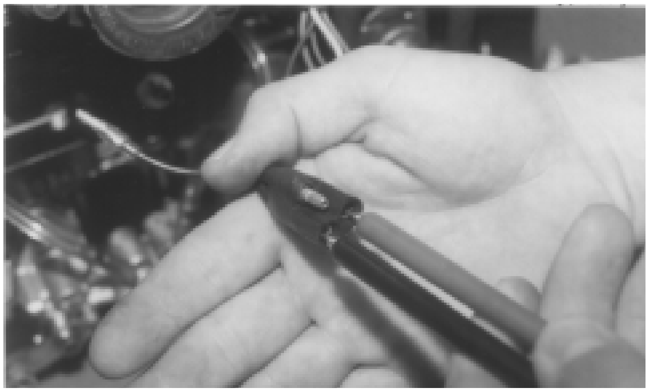
AK050D

4. Ignition coil secondary resistance must be between 6800-10,200 ohms.

CHARGE COIL (High Speed)

1. Disconnect the triple-wire plug from the ECU to the magneto.
2. Set the selector in the X1 position.
3. Connect the red meter lead to the black wire (500/580 cc) or to the green/red wire (600 cc) in the plug; then connect the black meter lead to the green wire (500/580 cc) or to the brown/white wire (600 cc) in the plug.

Fig. 5-12



AK014

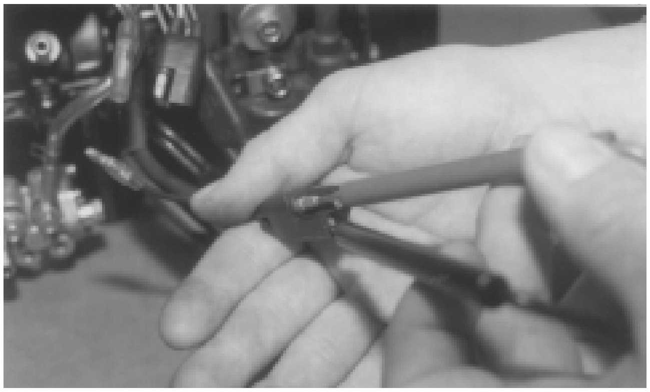
4. Charge coil (high speed) resistance must be between 36.8-55.2 ohms (500/580 cc) or 13.6-20.4 ohms (600 cc).

CHARGE COIL (Low Speed)

1. Disconnect the triple-wire plug from the ECU to the magneto.
2. Set the selector in the X100 position (500/580 cc) or X10 (600 cc).

3. Connect the red meter lead to the brown wire (500/580 cc) or to the black/red wire (600 cc) in the plug; then connect the black meter lead to the green wire (500/580 cc) or to the green/red wire (600 cc) in the plug.

Fig. 5-13



AK013

4. Charge coil (low speed) resistance must be between 360-540 ohms (500/580 cc) or 13.6-20.4 ohms (600 cc).

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.

2. Set the selector in the X1 position.

3. Connect the two meter leads to each of the yellow leads in the connector from the engine.

Fig. 5-14



AK015

4. Lighting coil resistance must be between 0.07-0.10 ohm (500/580 cc) or 0.08-0.12 ohm (600 cc).

IGNITION TIMING SENSOR

1. Disconnect the two timing sensor leads (green/white and brown) from the ECU.

2. Connect the meter leads to the sensor leads.

3. Ignition timing sensor resistance must be between 152-228 ohms.

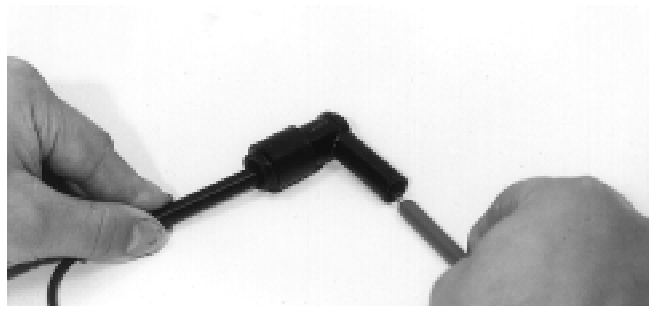
SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.

2. Set the selector in the X1K position.

3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.

Fig. 5-15



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

1. Remove the main wiring harness connectors from the ignition switch.

2. Rotate the key to the OFF position.

3. The meter must read less than 1 ohm resistance between the ignition switch terminals.

4. Rotate the key to the RUN position.

5. The meter must read OL (infinite resistance).

Testing Electrical Resistances
(Fan Cooled Models)

■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

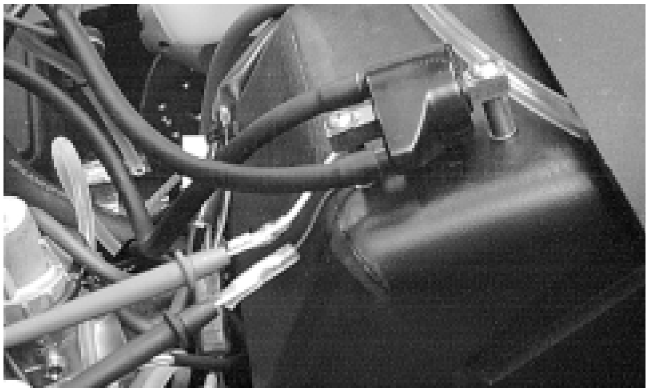
IGNITION COIL (PRIMARY)

1. Disconnect the two connectors from the CDI unit to the ignition coil.

2. Set the selector in the X1 position.

3. Connect the red meter lead to the orange lead; then connect the black meter lead to the black lead.

Fig. 5-16



AK051D

4. Ignition coil primary resistance must be between 0.25-0.34 ohm.

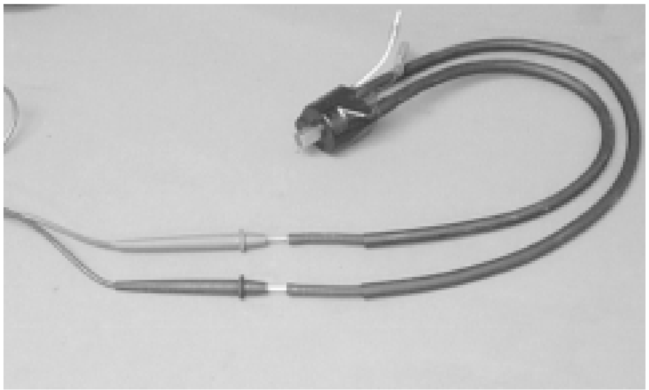
IGNITION COIL (SECONDARY)

1. Remove the spark-plug caps from the high tension wires.

2. Set the selector in the X1K position.

3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

Fig. 5-17



AK050D

4. Ignition coil secondary resistance must be between 6800-10,200 ohms.

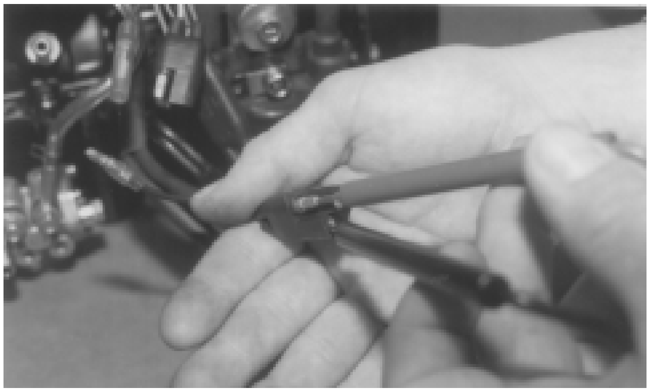
CHARGE COIL

1. Disconnect the triple-wire plug from the CDI unit to the magneto.

2. Set the selector in the X100 position.

3. Connect the red meter lead to the red/white wire in the plug; then connect the black meter lead to the black/red wire in the plug.

Fig. 5-18



AK013

4. Charge coil resistance must be between 128-192 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.

2. Set the selector in the X1 position.

3. Connect the two meter leads to each of the yellow leads in the connector from the engine.

Fig. 5-19



AK015

4. Lighting coil resistance must be between 0.17-0.26 ohm.

SPARK-PLUG CAP

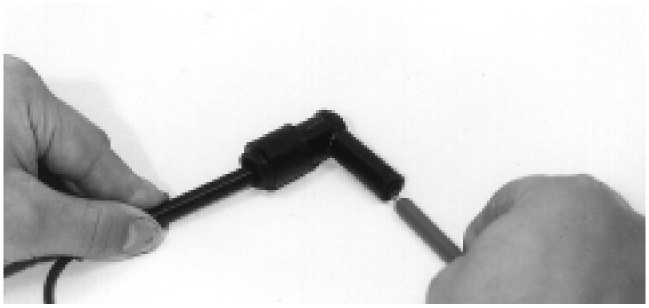
1. Remove the spark-plug caps from the high tension wires.

2. Set the selector in the X1K position.

3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.

5

Fig. 5-20



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

1. Remove the main wiring harness connectors from the ignition switch.
2. Rotate the key to the OFF position.
3. The meter must read less than 1 ohm resistance between the ignition switch terminals.
4. Rotate the key to the RUN position.
5. The meter must read OL (infinite resistance).

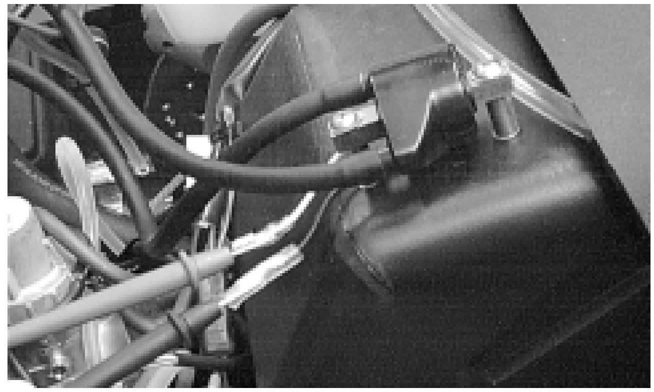
Testing Electrical Resistances
(440 cc L/C Model)

■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

IGNITION COIL (PRIMARY)

1. Disconnect the double wire plug from the CDI unit to the ignition coil.
2. Set the selector in the X1 position.
3. Connect the red meter lead to the orange lead; then connect the black meter lead to the black/white lead.

Fig. 5-21



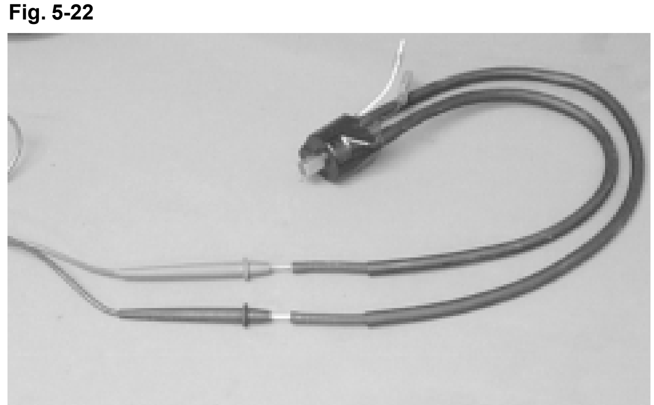
AK051D

4. Ignition coil primary resistance must be between 0.078-0.106 ohm.

IGNITION COIL (SECONDARY)

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the X1K position.
3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

Fig. 5-22



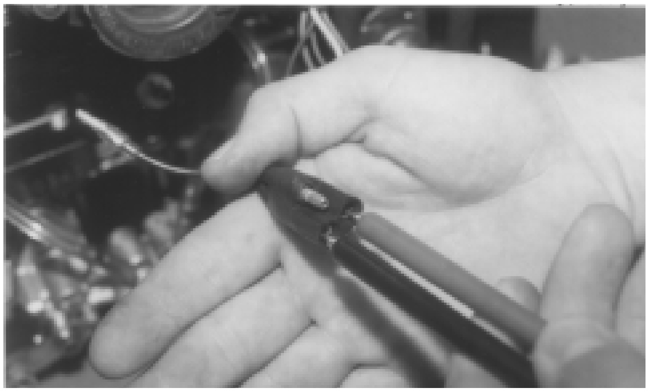
AK050D

4. Ignition coil secondary resistance must be between 3485-4715 ohms.

CHARGE COIL (1)

1. Disconnect the triple-wire plug from the CDI unit to the magneto.
2. Set the selector in the X1K position.
3. Connect the red meter lead to the green wire in the plug; then connect the black meter lead to the black/white wire in the plug.

Fig. 5-23



AK014

4. Charge coil (1) resistance must be between 1134-1386 ohms.

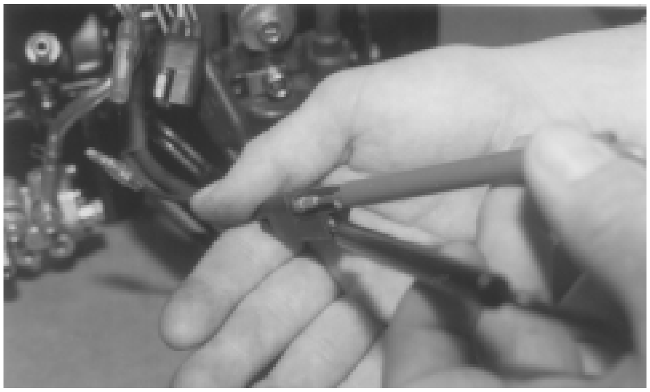
CHARGE COIL (2)

1. Disconnect the triple-wire plug from the CDI unit to the magneto.

2. Set the selector in the X10 position.

3. Connect the red meter lead to the white/red wire in the plug; then connect the black meter lead to the black/white wire in the plug.

Fig. 5-24



AK013

4. Charge coil (2) resistance must be between 14.31-17.49 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.

2. Set the selector in the X1 position.

3. Connect the two meter leads to each of the yellow leads in the connector from the engine.

Fig. 5-25



AK015

4. Lighting coil resistance must be between 0.099-0.121 ohm.

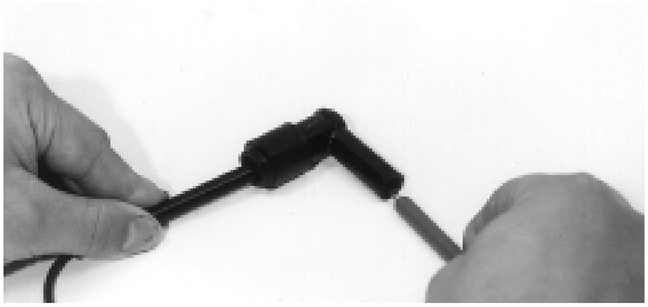
SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.

2. Set the selector in the X1K position.

3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.

Fig. 5-26



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

1. Remove the main wiring harness connectors from the ignition switch.

2. Rotate the key to the OFF position.

3. The meter must read less than 1 ohm of resistance between the ignition switch terminals.

4. Rotate the key to the RUN position.

5. The meter must read OL (infinite resistance).

Testing Electrical Resistances
(500/600 cc Twin Carburetor Models)

■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

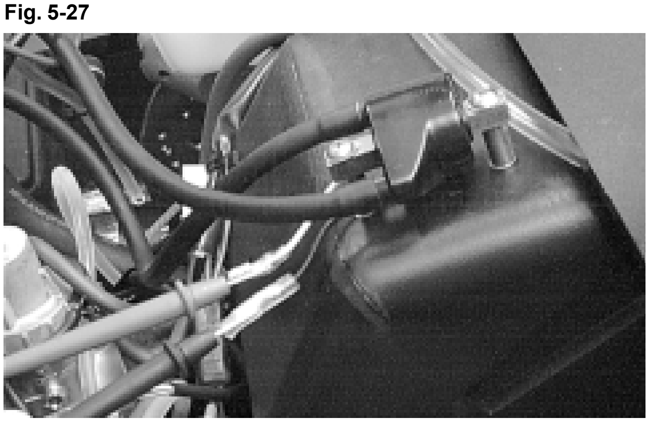
IGNITION COIL (PRIMARY)

1. Disconnect the double wire plug from the CDI unit to the ignition coil.

2. Set the selector in the X1 position.

3. Connect the red meter lead to the orange wire in the plug; then connect the black meter lead to the black wire (500 cc) or the black/white wire (600 cc) in the plug.

Fig. 5-27



AK051D

4. Ignition coil primary resistance must be between 0.25-0.34 ohm (500 cc) or 0.079-0.105 ohm (600 cc).

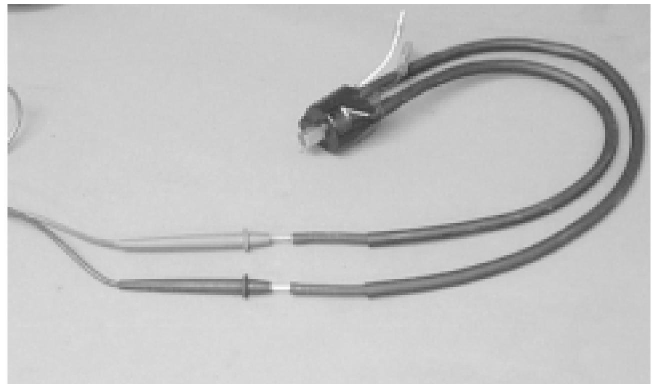
IGNITION COIL (SECONDARY)

1. Remove the spark-plug caps from the high tension wires.

2. Set the selector in the X1K position.

3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

Fig. 5-28



AK050D

4. Ignition coil secondary resistance must be between 6800-10,200 ohms (500 cc) or 3520-5280 ohms (600 cc).

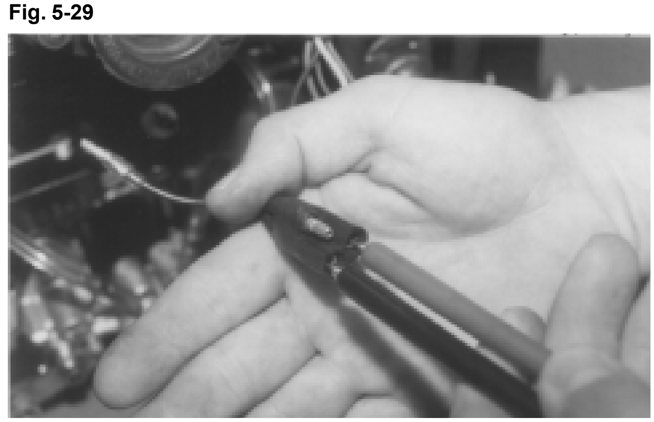
CHARGE COIL (1)

1. Disconnect the triple-wire plug from the CDI unit to the magneto.

2. Set the selector in the X1 position.

3. Connect the red meter lead to the green wire in the plug; then connect the black meter lead to the black/red wire (500 cc) or the green wire (600 cc) in the plug.

Fig. 5-29



AK014

4. Charge coil (1) resistance must be between 36.8-55.2 ohms.

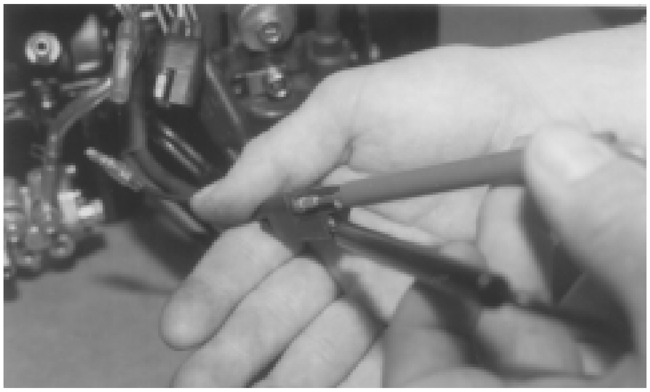
CHARGE COIL (2) - (500 cc)

1. Disconnect the triple-wire plug from the CDI unit to the magneto.

2. Set the selector in the X100 position.

3. Connect the red meter lead to the green wire in the plug; then connect the black meter lead to the white wire in the plug.

Fig. 5-30



AK013

4. Charge coil (2) resistance must be between 360-540 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.
2. Set the selector in the X1 position.
3. Connect the two meter leads to each of the yellow leads in the connector from the engine.

Fig. 5-31



AK015

4. Lighting coil resistance must be between 0.12-0.18 ohm (500 cc) or 0.16-0.24 ohm (600 cc).

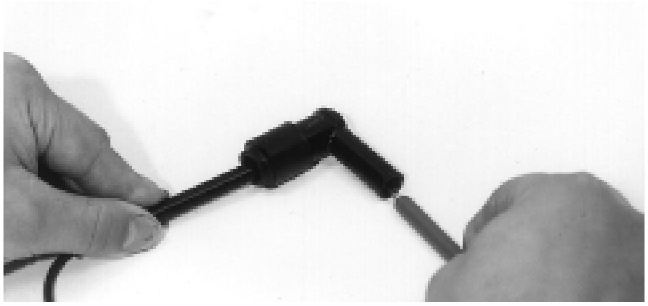
IGNITION TIMING SENSOR

1. Disconnect the two timing sensor leads (green/white and brown) from the CDI unit.
2. Connect the meter leads to the sensor leads.
3. Ignition timing sensor resistance must be between 80.8-121.2 ohms.

SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the X1K position.
3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.

Fig. 5-32



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

1. Remove the main wiring harness connectors from the ignition switch.
2. Rotate the key to the OFF position.
3. The meter must read less than 1 ohm resistance between the ignition switch terminals.
4. Rotate the key to the RUN position.
5. The meter must read OL (infinite resistance).

5

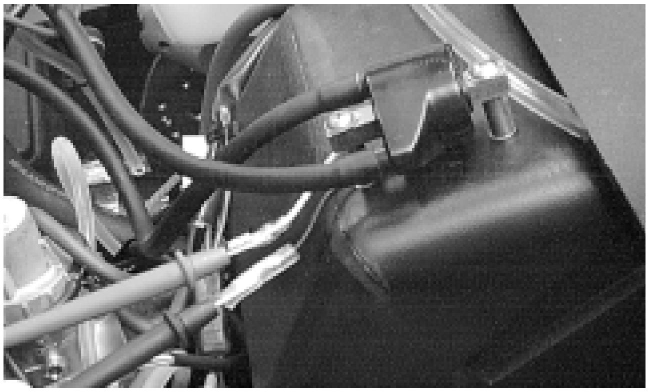
Testing Electrical Resistances (550 cc Models)

■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

IGNITION COIL (PRIMARY)

1. Disconnect the double wire plug from the CDI unit to the ignition coil.
2. Set the selector in the X1 position.
3. Connect the red meter lead the orange wire in the plug; then connect the black meter lead to the black wire in the plug.

Fig. 5-33



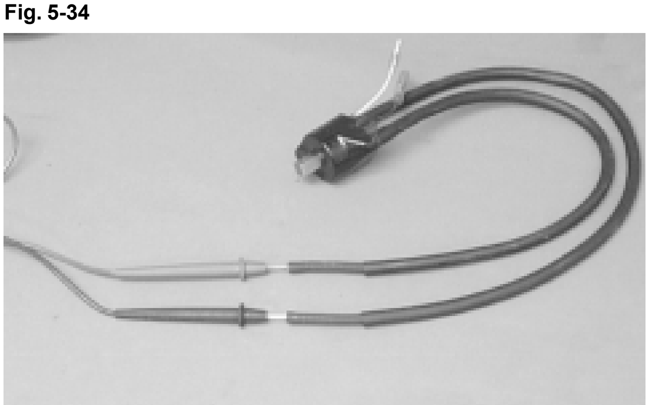
AK051D

4. Ignition coil primary resistance must be between 0.25-0.34 ohm.

IGNITION COIL (SECONDARY)

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the X1K position.
3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

Fig. 5-34



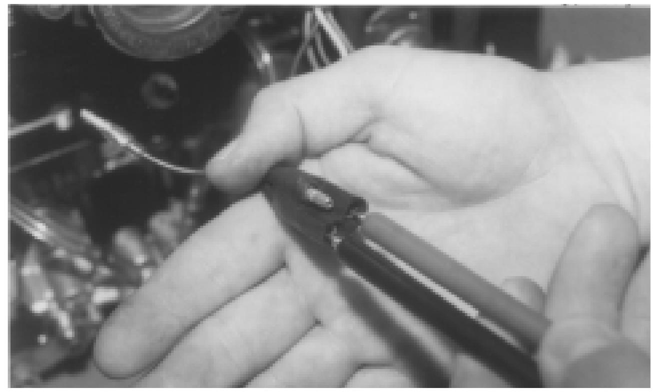
AK050D

4. Ignition coil secondary resistance must be between 6800-10,200 ohms.

CHARGE COIL (1)

1. Disconnect the triple-wire plug from the CDI unit to the magneto.
2. Set the selector in the X100 position.
3. Connect the red meter lead to the red/white wire in the plug; then connect the black meter lead to the black/white wire in the plug.

Fig. 5-35



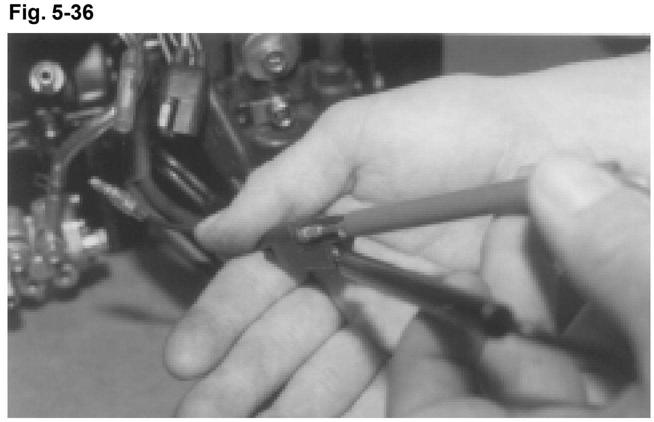
AK014

4. Charge coil (1) resistance must be between 128-192 ohms.

CHARGE COIL (2)

1. Disconnect the triple-wire plug from the CDI unit to the magneto.
2. Set the selector in the X1 position.
3. Connect the red meter lead to the black/red wire in the plug; then connect the black meter lead to the red/white wire in the plug.

Fig. 5-36



AK013

4. Charge coil (2) resistance must be between 13.6-20.4 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.
2. Set the selector in the X1 position.
3. Connect the two meter leads to each of the yellow leads in the connector from the engine.

Fig. 5-37



AK015

4. Lighting coil resistance must be between 0.17-0.26 ohm.

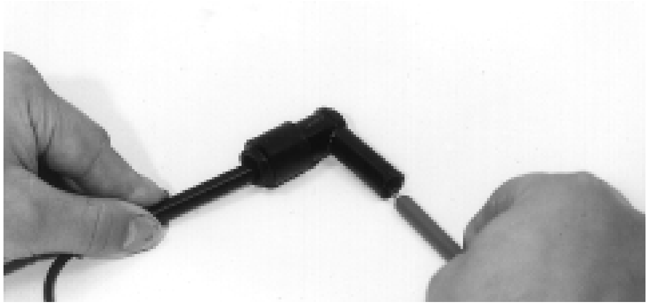
SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.

2. Set the selector in the X1K position.

3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.

Fig. 5-38



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

1. Remove the main wiring harness connectors from the ignition switch.

2. Rotate the key to the OFF position.

3. The meter must read less than 1 ohm of resistance between the ignition switch terminals.

4. Rotate the key to the RUN position.

5. The meter must indicate OL (infinite resistance).

Testing Electrical Resistances (600 cc Triple Models)

■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

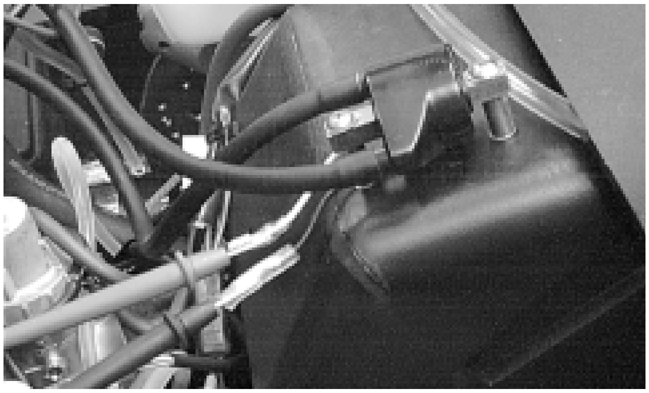
IGNITION COIL (PRIMARY)

1. Disconnect the spade connectors from the ignition coil body.

2. Set the selector in the X1 position.

3. Connect the red meter lead to the positive spade terminal; then connect the black meter lead to the negative spade terminal.

Fig. 5-39



AK051D

4. Ignition coil primary resistance must be between 0.29-0.39 ohm.

IGNITION COIL (SECONDARY)

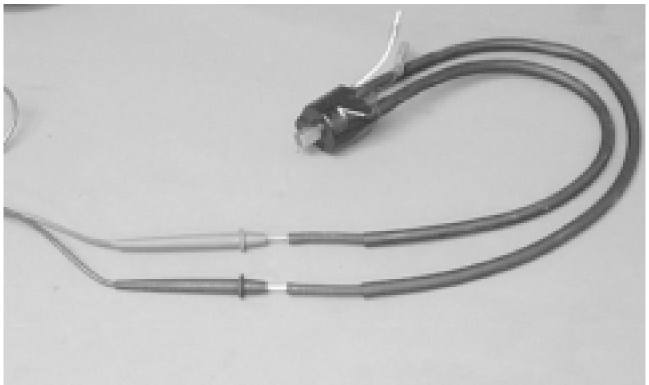
1. Remove the spark-plug caps from the high tension wires.

2. Set the selector in the X1K position.

3. On the dual lead coil, connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

4. On the single lead coil, connect the red meter lead to one high tension wire; then connect the black meter lead to the positive spade terminal.

Fig. 5-40



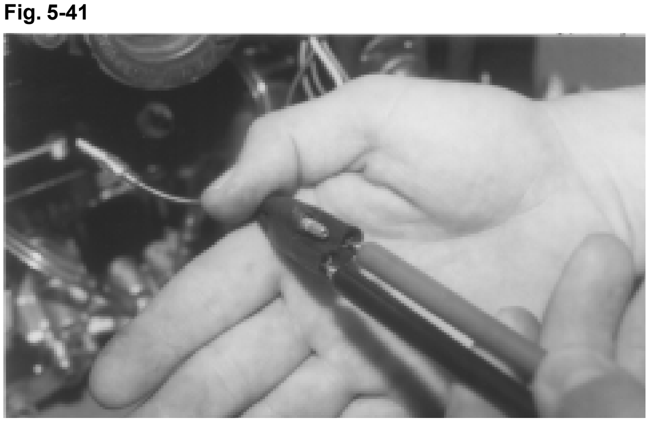
AK050D

5. Ignition coil secondary resistance must be between 6320-9480 ohms on both coils.

CHARGE COIL (1)

1. Disconnect the four-wire plug from the CDI unit to the magneto.
2. Set the selector in the X1 position.
3. Connect the red meter lead to the green wire in the plug; then connect the black meter lead to the black/red wire in the plug.

Fig. 5-41



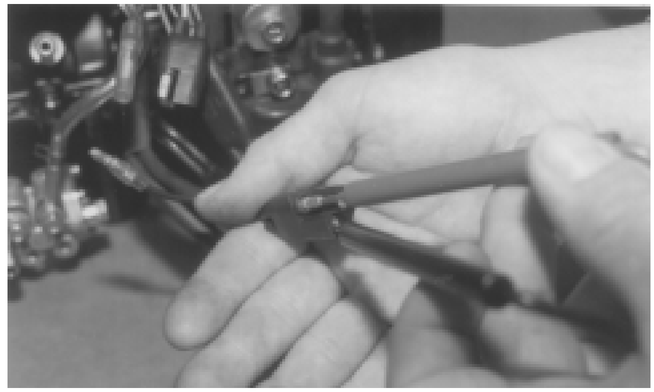
AK014

4. Charge coil (1) resistance must be between 16-24 ohms.

CHARGE COIL (2)

1. Disconnect the four-wire plug from the CDI unit to the magneto.
2. Set the selector in the X100 position.
3. Connect the red meter lead to the green wire in the plug; then connect the black meter lead to the white wire in the plug.

Fig. 5-42



AK013

4. Charge coil (2) resistance must be between 360-540 ohms.

IGNITION TIMING SENSOR

1. Disconnect the two timing sensor leads (green/white and brown) from the CDI unit.
2. Connect the meter leads to the sensor leads.
3. Ignition timing sensor resistance must be between 80.8-121.2 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.
2. Set the selector in the X1 position.
3. Connect the two meter leads to each of the yellow leads in the connector from the engine.

Fig. 5-43



AK015

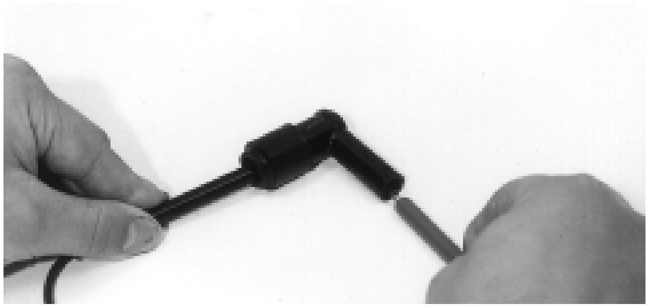
4. Lighting coil resistance must be between 0.12-0.18 ohm.

SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the X1K position.

3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.

Fig. 5-44



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

1. Remove the main wiring harness connectors from the ignition switch.
2. Rotate the key to the OFF position.
3. The meter must read less than 1 ohm of resistance between the ignition switch terminals.
4. Rotate the key to the RUN position.
5. The meter must read OL (infinite resistance).

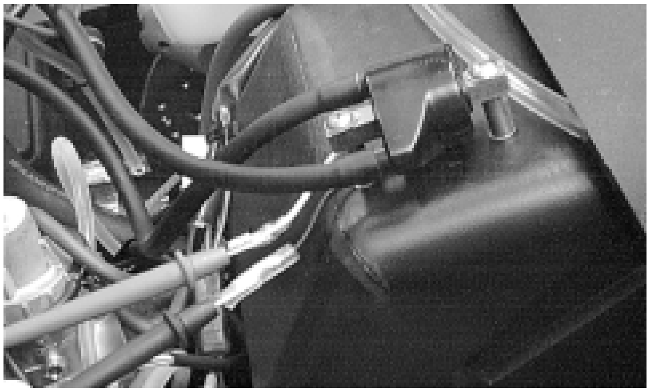
Testing Electrical Resistances (700 cc Models)

■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

IGNITION COIL (PRIMARY)

1. Disconnect the double wire plug from the CDI unit to the ignition coil.
2. Set the selector in the X1 position.
3. Connect the red meter lead to the orange lead; then connect the black meter lead to the black lead.

Fig. 5-45



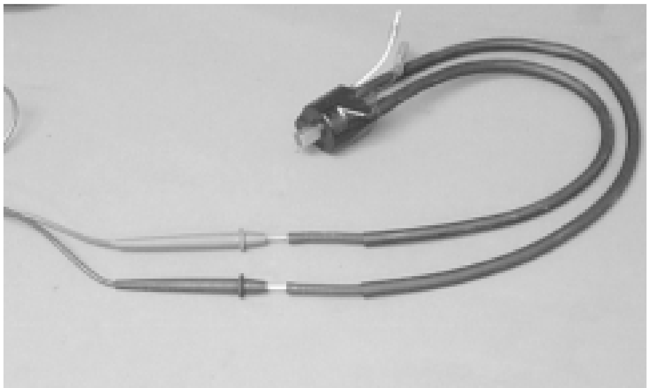
AK051D

4. Ignition coil primary resistance must be between 0.25-0.34 ohm.

IGNITION COIL (SECONDARY)

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the X1K position.
3. Connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

Fig. 5-46



AK050D

4. Ignition coil secondary resistance must be between 6800-10,200 ohms.

CHARGE COIL (1)

1. Disconnect the four-wire plug from the CDI unit to the magneto.
2. Set the selector in the X1 position.
3. Connect the red meter lead to the black/red wire in the plug; then connect the black meter lead to the green/red wire in the plug.
4. Charge coil (1) resistance must be between 13.6 - 20.4 ohms.

5

CHARGE COIL (2)

1. Disconnect the four-wire plug from the CDI unit to the magneto.
2. Set the selector in the X1 position.
3. Connect the red meter lead to the green/red wire in the plug; then connect the black meter lead to the brown/white wire in the plug.
4. Charge coil (2) resistance must be between 13.6 - 20.4 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.
2. Set the selector in the X1 position.
3. Connect the two meter leads to each of the yellow leads in the connector from the engine.

Fig. 5-47



AK015

4. Lighting coil resistance must be between 0.12 -0.19 ohm.

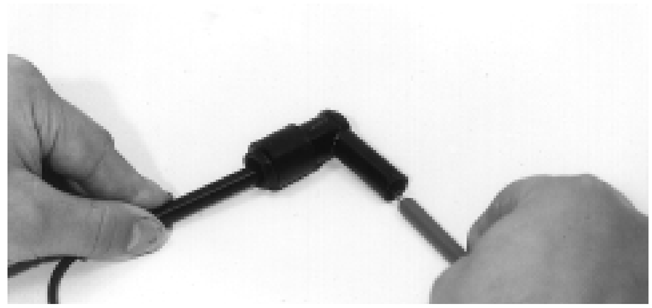
IGNITION TIMING SENSOR

1. Disconnect the two timing sensor leads (green/white and brown) from the CDI unit.
2. Connect the meter leads to the sensor leads.
3. Ignition timing sensor resistance must be between 80.8-121.2 ohms.

SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.
2. Set the selector in the X1K position.
3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.

Fig. 5-48



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

1. Remove the main wiring harness connectors from the ignition switch.
2. Rotate the key to the OFF position.
3. The meter must read less than 1 ohm resistance between the ignition switch terminals.
4. Rotate the key to the RUN position.
5. The meter must read OL (infinite resistance).

Testing Electrical Resistances (800/1000 cc Models)

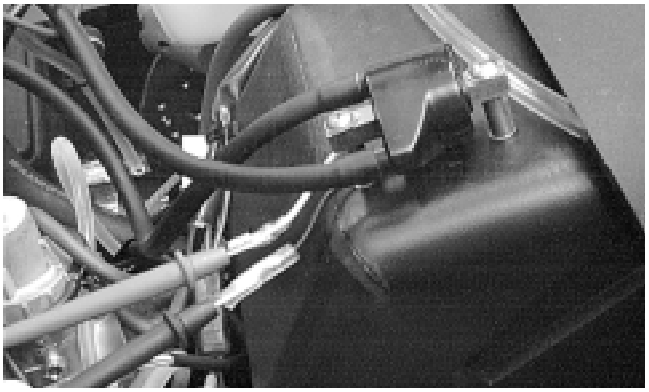
■ **NOTE: Resistance tests of the engine electrical components should be made using the Fluke Multimeter only. Analog-style multitesters may not be accurate enough to use in these critical tests. Replace any component that does not have a test value within specifications.**

IGNITION COIL (PRIMARY)

■ **NOTE: Both ignition coils can be tested using the following procedure.**

1. Disconnect the spade connectors from the external coil body.
2. Set the selector in the X1 position.
3. Connect the red meter lead to the positive spade terminal; then connect the black meter lead to the negative spade terminal.

Fig. 5-49



AK051D

4. Ignition coil primary resistance must be between 0.29-0.39 ohm.

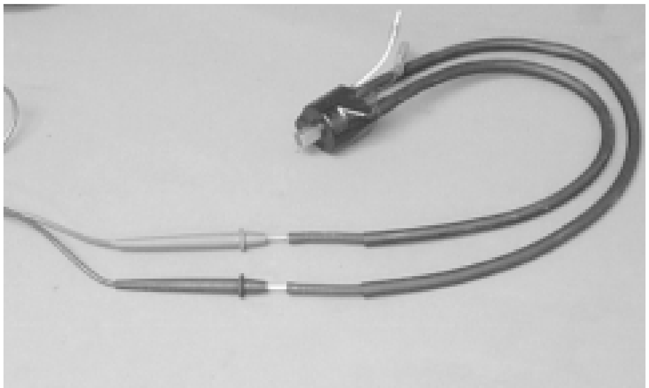
IGNITION COIL (SECONDARY)

1. Remove the spark-plug caps from the high tension wires.

2. Set the selector in the X1K position.

3. On the dual lead coil, connect the red meter lead to one high tension wire; then connect the black meter lead to the other high tension wire.

Fig. 5-50



AK050D

4. On the single lead coil, connect the red meter lead to one high tension wire; then connect the black meter lead to the positive spade terminal.

5. Ignition coil secondary resistance on both coils must be between 6320-9480 ohms.

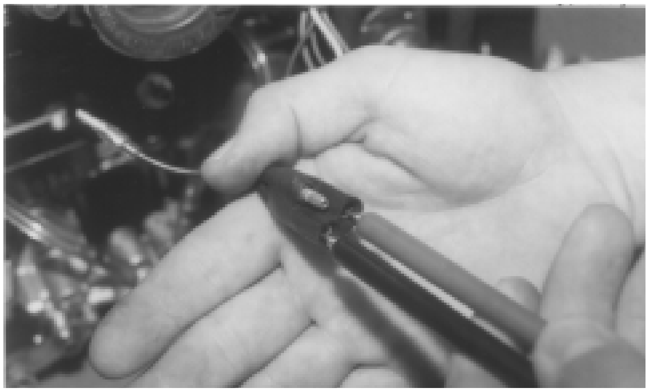
CHARGE COIL (1)

1. Disconnect the four-wire plug from the CDI unit to the magneto.

2. Set the selector in the X1 position.

3. Connect the red meter lead to the black/red wire in the plug; then connect the black meter lead to the green/red wire in the plug.

Fig. 5-51



AK014

4. Charge coil (1) resistance must be between 12-18 ohms.

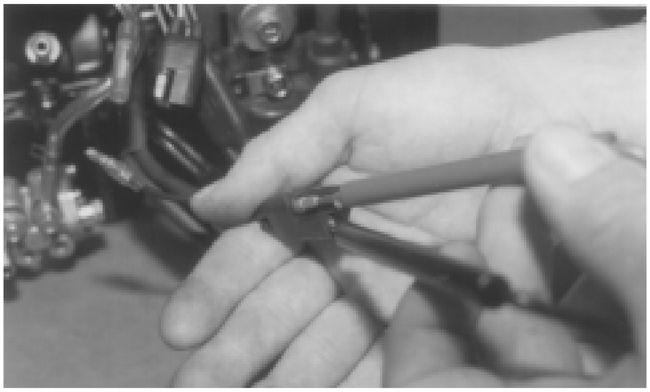
CHARGE COIL (2)

1. Disconnect the four-wire plug from the CDI unit to the magneto.

2. Set the selector in the X1 position.

3. Connect the red meter lead to the brown/white wire in the plug; then connect the black meter lead to the green/red wire in the plug.

Fig. 5-52



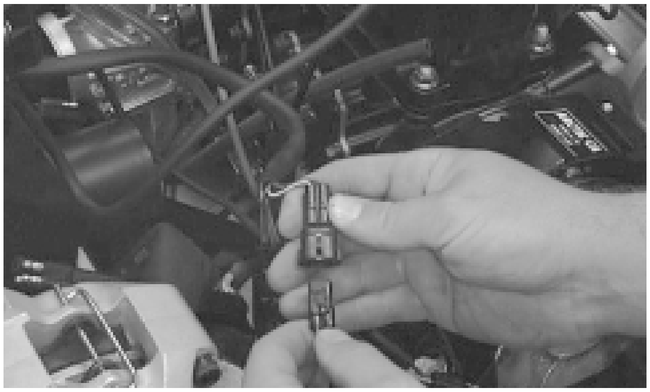
AK013

4. Charge coil (2) resistance must be between 12-18 ohms.

IGNITION TIMING SENSOR

1. Disconnect the green/white and brown wires from the timing sensor to the main harness.

Fig. 5-53



AO102D

2. Set the selector in the X10 position.

3. Connect the red tester lead to the green/white wire; then connect the black tester lead to the brown wire.

4. Ignition timing sensor resistance must be between 80.8 and 121.2 ohms.

LIGHTING COIL

1. Disconnect the main wiring harness from the engine.

2. Set the selector in the X1 position.

3. Connect the two meter leads to each of the yellow leads in the connector from the engine.

Fig. 5-54



AK015

4. Lighting coil resistance must be between 0.12-0.18 ohm.

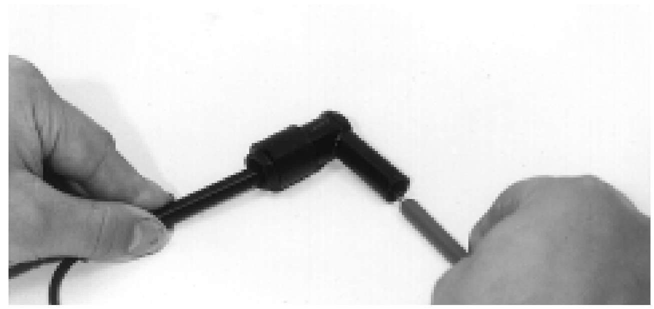
SPARK-PLUG CAP

1. Remove the spark-plug caps from the high tension wires.

2. Set the selector in the X1K position.

3. In turn on each cap, touch a tester lead to each end of the spark-plug cap.

Fig. 5-55



B170

4. Spark-plug cap resistance must be between 4000-6000 ohms.

IGNITION SWITCH

1. Remove the main wiring harness connectors from the ignition switch.

2. Rotate the key to the OFF position.

3. The meter must read less than 1 ohm resistance between the ignition switch terminals.

4. Rotate the key to the RUN position.

5. The meter must read OL (infinite resistance).

Arctic Cat Ignition Analyzer (Fan Cooled Models)

■ **NOTE: Ignition analyzer test specifications are on the Electrical Specifications (Individual) pages in this section.**

The Ignition Analyzer can perform the following tests.

A. Stator Plate Charge Coil Output

B. Stator Plate Lighting Coil Output

C. CDI Unit Output

D. System Regulated Voltage

E. Battery Voltage

F. Spark-Plug Voltage (with optional High Voltage Sensor)

⚠ CAUTION

Do not connect any analyzer harness lead wires directly to the spark plug high tension wires or analyzer failure will result. The optional high voltage sensor must be used to measure any voltage exceeding 1000 volts.

⚠ WARNING

Most voltages generated by the ignition system are sufficient to interrupt pacemakers! All technicians, especially those using pacemakers, must avoid contact with all electrical connections after the engine has been started.

A. ANALYZER SETUP PROCEDURE

1. Connect the Analyzer Wiring Harness (p/n 0686-069) into the analyzer back-panel jack. Rotate the harness connector to position the alignment slots. Complete insertion of the connector and secure the connector nut.

Fig. 5-56



AK059D

2. Disconnect the rubber straps from the analyzer lower strap posts. Position the analyzer on the handlebar pad and wrap the straps around the pad. Stretch the straps and install them on the lower strap posts.

Fig. 5-57



AK060D

3. Disconnect the four-prong stator plate/main harness connector. Insert both four-prong analyzer wiring harness connectors making certain that both connectors are completely seated.

4. Disconnect the three-prong stator plate/CDI connector. Insert both three-prong analyzer wiring harness connectors making certain that both connectors are completely seated.

5. Disconnect the two-prong CDI/ignition coil connector. Insert both two-prong analyzer wiring harness connectors making certain that both connectors are completely seated.

■**NOTE: The color code of the two-prong connectors must be observed. The two black/white wires must be connected together and the two white/blue wires must be connected.**

⚠ WARNING

Elevate the snowmobile track with a good quality safety stand when performing tests in the shop area. Do not allow anyone near the front or back of the machine while conducting these tests.

⚠ CAUTION

Check the analyzer wiring harness routing before starting the engine. Do not allow the analyzer harness to contact the exhaust system, driven shaft, clutches, or the drive belt.

6. Start the engine and allow it to idle for about five minutes. Select the analyzer TACH switch position, rotate the selector to the LIGHT/TACH position, and then increase the engine speed to 2000, 3000, and 4000 RPM. If the snowmobile tachometer is within 120 RPM of the analyzer reading, the snowmobile tachometer can be used when conducting the following tests. If the reading is not within 120 RPM or if the snowmobile is not equipped with a tachometer, the analyzer tachometer must be used to set the following RPM.

7. In many cases, if the tester readings are erratically flashing high and low numbers, this indicates one of the following conditions.

   A. Defective spark-plug cap - check cap and replace.

   B. Defective high tension lead wire end - cut 6 mm (1/4 in.) off the end of the wire and install cap.

   C. Defective resistor spark plug - install new spark plug.

Before any further testing can be done, locate the component causing the erratic readings and replace.

■ **NOTE: For troubleshooting a model that will not start, attach the analyzer as outlined under section A. Conduct all of the following tests using the recoil starter and cranking the engine over hard three times. Use the specifications called out for 2000 RPM.**

■ **NOTE: The individual components must be checked in the following sequence using the appropriate specifications chart for recommended values.**

B. CHARGE COIL OUTPUT TEST

1. Perform sub-section A before conducting this charge coil test.

2. Start the engine and allow it to idle for 4-5 minutes if not previously done in step A-6. Select the analyzer VOLT switch position and rotate the analyzer selector to the CHRG position.

3. Operate the engine at 2000 RPM and observe the analyzer charge coil reading. The observed reading must not be less than the recommended value. Next, observe the analyzer reading at 3000 and 4000 RPM.

4. If any readings are less than the listed values, disconnect the CDI unit from the system; then using the recoil starter, crank the engine over hard three to four times. If the reading is within tolerance for 2000 RPM, the CDI unit may be defective. Repeat the test once again after connecting the CDI unit and see if the reading is once again below specifications at cranking speed. If readings remain low, replace the CDI unit. If the test results remain low with the CDI unit disconnected, replace the charge coil.

■ **NOTE: A defective CDI unit can cause a low reading for the charge coil output test. To verify reading, step 4 under Charge Coil Output Test is very important.**

■ **NOTE: The observed readings are permitted to be greater than (but never less than) the recommended values.**

C. CDI OUTPUT TEST

1. Perform sub-sections A and B before conducting this CDI test.

2. Rotate the analyzer selector to the CDI position.

3. Operate the engine at 2000, 3000, and 4000 RPM. If any of the observed CDI readings are less than the recommended values, replace the CDI unit.

D. LIGHTING COIL OUTPUT TEST

⚠ WARNING

Elevate the snowmobile track with a goad quality safety stand when performing the lighting coil output test. Do not allow anyone near the front or back of the machine while conducting this test. All safety switches will be bypassed while conducting the lighting coil output test.

1. Perform sub-section A before conducting this lighting coil test.

2. Stop the snowmobile engine and disconnect the snowmobile main wiring harness from the four-prong analyzer wiring harness connector (the four-prong analyzer wiring harness connector must remain connected to the four-prong stator plate connector).

3. Insert an auxiliary ground wire into the black wire of the four-wire main harness connector on the engine side. To stop the engine once it has been started, touch the auxiliary ground wire to the engine.

4. Rotate the selector to the LIGHT/TACH position.

5. Operate the engine at 2000, 3000, and 4000 PM. If any of the observed lighting coil readings are less than the recommended values, replace the stator plate lighting coil.

⚠ WARNING

Stop the engine and remove the auxiliary ground wire before proceeding.

E. VOLTAGE REGULATOR OUTPUT TEST

⚠ WARNING

Elevate the snowmobile track with a good quality safety stand when performing the voltage regulator test. Do not allow anyone near the front or back of the machine while conducting this test. All safety switches will be bypassed while conducting the voltage regulator test.

1. Perform sub-section D before conducting this voltage regulator test.

2. Disconnect the analyzer wiring harness. Reconnect all snowmobile electrical connectors to their original positions.

3. Remove the analyzer from the handlebar and disconnect the analyzer wiring harness from the analyzer back-panel connector.

4. Remove the red and black lead wires from their carrying case. Insert the red lead wire connector into the analyzer front-panel red jack and the black lead wire into the black jack.

5. Rotate the selector to the EXT position. Select the snowmobile HIGH BEAM headlamp position.

6. Insert the analyzer black lead wire into the headlamp connector on the brown wire position using the appropriate lead wire end. Insert the analyzer red lead wire into the yellow wire position.

7. Operate the engine at 3000 to 4000 RPM. The observed reading must indicate between 30 to 36 volts. If the observed reading is less than 30 volts or more than 36 volts, replace the voltage regulator.

■ **NOTE: The analyzer is a "peak reading" voltmeter. Even though the regulator is limiting the system voltage to about 13 volts RMS (root mean squared), the analyzer is measuring and displaying voltage spikes of 30 to 36 volts. These spikes are normal and do not damage the snowmobile lights. Please remember that the analyzer will always display the maximum voltage spike present, not the "average" voltage that most meters display.**

⚠ CAUTION

Never use the analyzer front panel lead wires with the analyzer wiring harness connector inserted into the analyzer back-panel jack.

■ **NOTE: The Ignition Analyzer can conduct most of the electrical system performance tests while the snowmobile is operated in the normal "field" environment. If the electrical system "breaks down" after an extended warm-up or only at high speeds, simply operate the snowmobile until those conditions are achieved. The rotating selector switch on the analyzer front-panel (together with the analyzer's "multipoint wiring harness") makes the analyzer an extremely versatile test instrument. With the analyzer safely positioned on the handlebar pad within the operator's view, the analyzer is usable under normal operating conditions.**

Arctic Cat Ignition Analyzer
(Liquid Cooled Models)

■ **NOTE: Ignition analyzer test specifications are on the Electrical Specifications (Individual) pages in this section.**

The Ignition Analyzer can perform the following tests.

A. Stator Plate Charge Coil (1) Output

B. Stator Plate Charge Coil (2) Output

C. Stator Plate Lighting Coil Output

D. CDI Unit Output

E. System Regulated Voltage

F. Battery Voltage

G. Spark-Plug Voltage (with optional High Voltage Sensor)

⚠ CAUTION

Do not connect any analyzer harness lead wires directly to the spark plug high tension wires or analyzer failure will result. The optional high voltage sensor must be used to measure any voltage exceeding 1000 volts.

⚠ WARNING

Most voltages generated by the ignition system are sufficient to interrupt pacemakers! All technicians, especially those using pacemakers, must avoid contact with all electrical connections after the engine has been started.

A. ANALYZER SETUP PROCEDURE

1. Connect the Analyzer Wiring Harness (p/n 0686-069) into the analyzer back-panel jack. Rotate the harness connector to position the alignment slots. Complete insertion of the connector and secure the connector nut.

Fig. 5-58



AK059D

2. Disconnect the rubber straps from the analyzer lower strap posts. Position the analyzer on the handlebar pad and wrap the straps around the pad. Stretch the straps and install them on the lower strap posts.

Fig. 5-59



AK060D

3. Disconnect the four-prong stator plate/main harness connector. Insert both four-prong analyzer wiring harness connectors making certain that both connectors are completely seated.

4. Disconnect the three-prong stator plate/CDI connector. Insert both three-prong analyzer wiring harness connectors making certain that both connectors are completely seated.

5. Disconnect the two-prong CDI/ignition coil connector. Insert both two-prong analyzer wiring harness connectors making certain that both connectors are completely seated.

■ **NOTE: The color code of the two-prong connectors must be observed. The two black/white wires must be connected together and the two white/blue wires must be connected.**

⚠ WARNING

Elevate the snowmobile track with a good quality safety stand when performing tests in the shop area. Do not allow anyone near the front or back of the machine while conducting these tests.

⚠ CAUTION

Check the analyzer wiring harness routing before starting the engine. Do not allow the analyzer harness to contact the exhaust system, driven shaft, clutches, or the drive belt.

6. Start the engine and allow it to idle for about five minutes. Select the analyzer TACH switch position, rotate the selector to the LIGHT/TACH position, and then increase the engine speed to 2000, 3000, and 4000 RPM. If the snowmobile tachometer is within 120 RPM of the analyzer reading, the snowmobile tachometer can be used when conducting the following tests. If the reading is not within 120 RPM or if the snowmobile is not equipped with a tachometer, the analyzer tachometer must be used to set the following RPM.

7. In many cases, if the tester readings are erratically flashing high and low numbers, this indicates one of the following conditions.

   A. Defective spark-plug cap - check cap and replace.

   B. Defective high tension lead wire end - cut 6 mm (1/4 in.) off the end of the wire and install cap.

   C. Defective resistor spark plug - install new spark plug.

Before any further testing can be done, locate the component causing the erratic readings and replace.

■ **NOTE: For troubleshooting a model that will not start, attach the analyzer as outlined under section A. Conduct all of the following tests using the recoil starter and cranking the engine over hard three times. Use the specifications called out for 2000 RPM.**

■ **NOTE: The individual components must be checked in the following sequence using the appropriate specifications chart for recommended values.**

B. CHARGE COIL (1) OUTPUT TEST

1. Perform sub-section A before conducting this charge coil (1) test.

2. Start the engine and allow it to idle for 4-5 minutes if not previously done in step A-6. Select the analyzer VOLT switch position and rotate the analyzer selector to the CHRG position.

3. Operate the engine at 2000 RPM and observe the analyzer charge coil (1) reading. The observed reading must not be less than the recommended value. Next, observe the analyzer reading at 3000 and 4000 RPM.

4. If any readings are less than the listed values, disconnect the CDI unit from the system; then using the recoil starter, crank the engine over hard three to four times. If the reading is within tolerance for 2000 RPM, the CDI unit may be defective. Repeat the test once again after connecting the CDI unit and see if the reading is once again below specifications at cranking speed. If readings remain low, replace the CDI unit. If the test results remain low with the CDI unit disconnected, replace the coil.

■ **NOTE: A defective CDI unit can cause a low reading for both charge coil output tests. To verify readings, step 4 under Charge Coil (1) Output Test is very important.**

■ **NOTE: The observed readings are permitted to be greater than (but never less than) the recommended values.**

C. CHARGE COIL (2) OUTPUT TEST

1. Perform sub-sections A and B before conducting this charge coil (2) test.

2. Rotate the analyzer selector to the CHRG position.

3. Operate the engine at 2000, 3000, and 4000 RPM. If any of the observed coil readings are less than the recommended values, disconnect the CDI unit from the system and repeat test at cranking speed. Using the recoil, crank the engine over hard three times and observe readings. If the voltage is now within specifications, the CDI unit may be defective. Repeat test after connecting the CDI unit and see if the reading is once again below specifications at cranking speed. If readings remain low, replace the CDI unit. If the test results remain low with the CDI unit disconnected, replace the coil.

D. CDI OUTPUT TEST

1. Perform sub-sections A, B, and C before conducting this CDI test.

2. Rotate the analyzer selector to the CDI position.

3. Operate the engine at 2000, 3000, and 4000 RPM. If any of the observed CDI readings are less than the recommended values, replace the CDI unit.

E. LIGHTING COIL OUTPUT TEST

⚠ WARNING

Elevate the snowmobile track with a goad quality safety stand when performing the lighting coil output test. Do not allow anyone near the front or back of the machine while conducting this test. All safety switches will be bypassed while conducting the lighting coil output test.

1. Perform sub-section A before conducting this lighting coil test.

2. Stop the snowmobile engine and disconnect the snowmobile main wiring harness from the four-prong analyzer wiring harness connector (the four-prong analyzer wiring harness connector must remain connected to the four-prong stator plate connector).

3. Insert the supplied bypass plug into the four-prong analyzer wiring harness connector.

4. Rotate the selector to the LIGHT/TACH position.

5. Operate the engine at 2000, 3000, and 4000 RPM. If any of the observed lighting coil readings are less than the recommended values, replace the stator plate lighting coil.

⚠ WARNING

Stop the engine and remove the bypass plug before proceeding.

F. VOLTAGE REGULATOR OUTPUT TEST

⚠ WARNING

Elevate the snowmobile track with a good quality safety stand when performing the voltage regulator test. Do not allow anyone near the front or back of the machine while conducting this test. All safety switches will be bypassed while conducting the voltage regulator test.

1. Perform sub-section E before conducting this voltage regulator test.

2. Disconnect the analyzer wiring harness. Reconnect all snowmobile electrical connectors to their original positions.

3. Remove the analyzer from the handlebar and disconnect the analyzer wiring harness from the analyzer back-panel connector.

4. Remove the red and black lead wires from their carrying case. Insert the red lead wire connector into the analyzer front-panel red jack and the black lead wire into the black jack.

5. Rotate the selector to the EXT position. Select the snowmobile HIGH BEAM headlamp position.

6. Insert the analyzer black lead wire into the headlamp connector on the brown wire position using the appropriate lead wire end. Insert the analyzer red lead wire into the yellow wire position.

7. Operate the engine at 3000 to 4000 RPM. The observed reading must indicate between 30 to 36 volts. If the observed reading is less than 30 volts or more than 36 volts, replace the voltage regulator.

■ NOTE: The analyzer is a "peak reading" voltmeter. Even though the regulator is limiting the system voltage to about 13 volts RMS (root mean squared), the analyzer is measuring and displaying voltage spikes of 30 to 36 volts. These spikes are normal and do not damage the snowmobile lights. Please remember that the analyzer will always display the maximum voltage spike present, not the "average" voltage that most meters display.

⚠ CAUTION

Never use the analyzer front panel lead wires with the analyzer wiring harness connector inserted into the analyzer back-panel jack.

■ NOTE: The Ignition Analyzer can conduct most of the electrical system performance tests while the snowmobile is operated in the normal "field" environment. If the electrical system "breaks down" after an extended warm-up or only at high speeds, simply operate the snowmobile until those conditions are achieved. The rotating selector switch on the analyzer front-panel (together with the analyzer's "multipoint wiring harness") makes the analyzer an extremely versatile test instrument. With the analyzer safely positioned on the handlebar pad within the operator's view, the analyzer is usable under normal operating conditions.

Testing Voltage Regulator

1. Using a shielded safety stand, raise the rear of the snowmobile off the floor.

2. Using a multitester, connect the red tester lead to a yellow wire and the black tester lead to a brown wire in the accessory harness connector.

3. Set the selector on the 25 ACV position; then start the engine and allow to idle. The meter must read 11-13 volts.

4. Increase the engine speed to 2500-2700 RPM. The meter must read 11-13 volts. If the meter reads more than 13 volts, replace the voltage regulator.

Testing Low-Oil Light Sensor

The low-oil light sensor is a magnetic switch. Its operation is based on a magnet located around the inside diameter of a 1/2 in. hole in a plastic float. The switch located in the stem of the sending unit is positioned through the hole in the float. When the float drops to the lower part of the stem, the magnet closes the electrical contacts (located in the stem) allowing the current to pass on to the warning light.

If the sensor should fail, it must be replaced. To test the sensor, use the following procedure.

1. Remove the sensor from the oil reservoir by twisting and pulling upwards. Wipe excess oil from the sensor.

2. Unplug the sensor from the wiring harness.

3. Using an ohmmeter, set the selector on the X1K position.

4. Touch each of the meter leads to one of the two wires coming from the sensor. With the sensor in its normal position (float end down), the meter should read resistance.

5. If the meter reads no resistance, check to make sure good contact has been made with each of the wires coming from the sensor. If the meter still reads no resistance, replace the sensor.

6. While maintaining contact between the meter leads and the sensor, raise the float. The meter must read no resistance. If the meter reads resistance, replace the sensor.

7. If the sensor tested out satisfactory but the light doesn't illuminate with only a small amount of oil in the reservoir, check the bulb.

8. If the bulb is in good condition, check for voltage at the connection where the sensor plugs into the accessory wiring harness. Using a multimeter set on the 50 ACV scale, start the engine and allow it to idle. Touch the red lead of the voltmeter to the red wire in the two-prong connector. Touch the black lead to the black wire in the wiring harness. At idle, the meter should read 5 to 6 volts (AC). If no voltage is present but the lights on the snowmobile operate normally, either check the wiring harness for a broken wire or replace the harness.

Testing High Temperature Sensor

1. Disconnect the main wiring harness connector from the temperature sensor.

2. Connect an ohmmeter between the sensor terminal and any convenient chassis ground (or any brown wire). The ohmmeter must read less than 20 ohms of resistance with the water temperature more than +230°F. The ohmmeter must read no resistance with the water temperature less than +190°F.

■ NOTE: It may be easier to remove the sensor from the water manifold for testing purposes. Immerse the sensor body (only up to the threads) in automatic transmission fluid and slowly heat the fluid. The ohmmeter must indicate the above resistances when connected between the sensor terminal and the sensor body/chassis.

Testing High Temperature Warning Light

1. Disconnect the main wiring harness connector from the temperature sensor.

2. Temporarily place a jumper wire from the main wiring harness sensor connector to any convenient chassis ground (or any brown wire).

3. If the high temperature warning light is not illuminated with the engine running (and the harness terminal grounded), test the light bulb. An ohmmeter must read less than 10 ohms across the bulb filament.

4. If the bulb does not illuminate even when tested good, use the ohmmeter to test the bulb harness. Also test the red/white wire continuity from the temperature sensor connector to the bulb connector.

Solenoid (Electric Start Models)

TESTING

■ **NOTE: The electric start solenoid may be tested using either one of the following methods.**

Method #1

1. Disconnect the electric start harness from the main wiring harness.

2. Place the ohmmeter leads across the solenoid coil terminals (brown wire and red/white wire).

3. The ohmmeter must read between 3 and 5 ohms.

Method #2

1. Connect the battery to the solenoid coil terminals (brown wire and red/white wire).

2. A loud, audible “click” should be heard as the solenoid internal contacts make connection.

3. Disconnect the battery from the solenoid.

4. A loud, audible “click” should be heard as the solenoid internal contacts release.

■ **NOTE: An in-line ammeter would measure between 2 and 4 amps of solenoid coil current flow with the battery connected.**

⚠ CAUTION

NEVER connect an in-line ammeter with the large starter cables because the 200 amps of current flow will instantly damage most ammeters.

Charging Diode (Electric Start Models)

TESTING

1. Disconnect the electric start harness from the main wiring harness.

⚠ CAUTION

To prevent ohmmeter damage when testing circuits on snowmobiles equipped with an electric start, be sure to disconnect the battery before testing.

2. Connect the ohmmeter positive lead (red) to the diode yellow wire and the ohmmeter negative lead (black) to the diode red wire. The ohmmeter must read between 300 and 700 ohms.

3. Connect the ohmmeter positive lead (red) to the diode red wire and the ohmmeter negative lead (black) to the diode yellow wire. The ohmmeter must read OPEN (infinite resistance).

Fuse (Electric Start Models)

TESTING

1. Remove the fuse from the fuse holder.

2. Connect the ohmmeter across the fuse end-caps.

3. The ohmmeter must read less than 1 ohm of resistance.

Ignition Switch - Electric Start Function (Electric Start Models)

TESTING

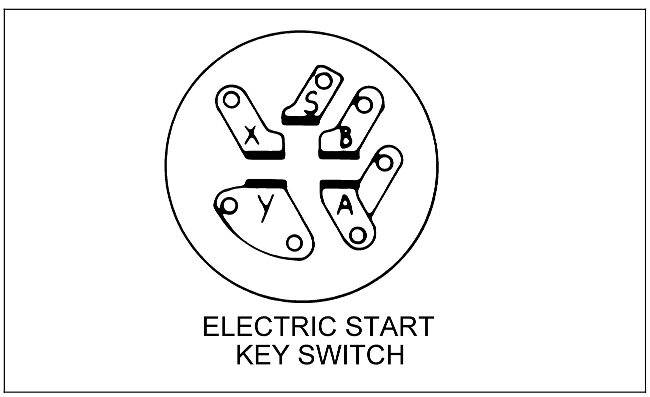
⚠ CAUTION

To prevent ohmmeter damage when testing circuits on snowmobiles equipped with an electric start, be sure to disconnect the battery before testing.

1. Disconnect the wiring harness from the ignition switch; then remove the switch from the console.
2. Using the ohmmeter, test the connections indicated in the following chart. If the meter does not read as specified or has more than one ohm of resistance, the switch must be replaced.

Position	Lead to Terminal	Lead to Terminal	Meter Reading
OFF	ANY	ANY	OPEN
ON	X	Y	CLOSED
ON	B	A	CLOSED
START	X	Y	CLOSED
START	B	S	CLOSED

Fig. 5-60



686-087A

■ **NOTE: Some ignition-switch terminals may not be labeled (X, Y, A, B, or S). Also, some ignition-switch terminals may be improperly labeled. Refer to the wiring harness diagrams of the ignition switch when connecting the ohmmeter. Using the designations stamped on the ignition-switch terminals when connecting the ohmmeter may result in erroneous resistance readings.**

Starter Motor

REMOVING

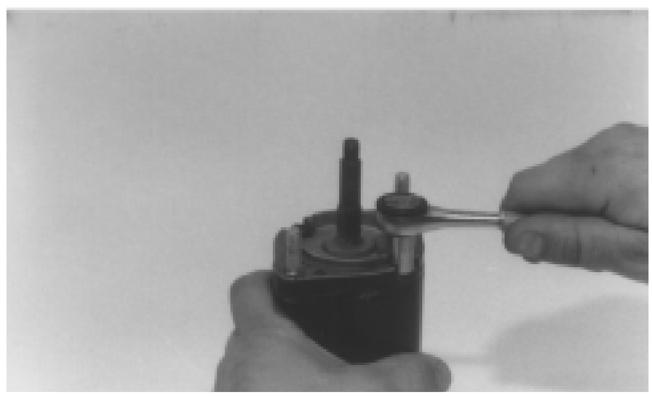
1. Disconnect the battery.
2. Remove the PTO-side and center expansion chambers.
3. Remove the nut and lock washer securing the positive cable; then remove cable from the starter motor.
4. Remove the drive clutch (see Section 8).
5. Remove the two lock nuts and one machine screw securing the starter motor and end cap assembly to the bracket; then remove the starter motor and end cap assembly.

DISASSEMBLING

■ **NOTE: For assembly purposes, scribe a reference line on the front cap, rear cap, and the case.**

1. Remove the snap ring securing the drive gear to the starter motor; then remove the drive gear and account for the spring washer.
2. Remove the two long starter motor bolts. As the bolts are being removed, hold pressure against the rear brush cover.

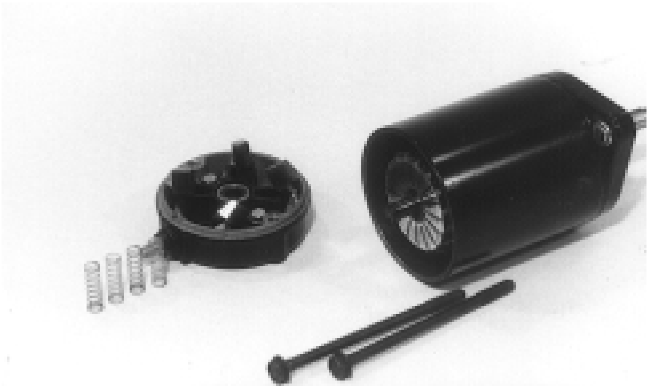
Fig. 5-61



AI050

3. Slowly remove the rear brush cover and account for the four brush holder springs.

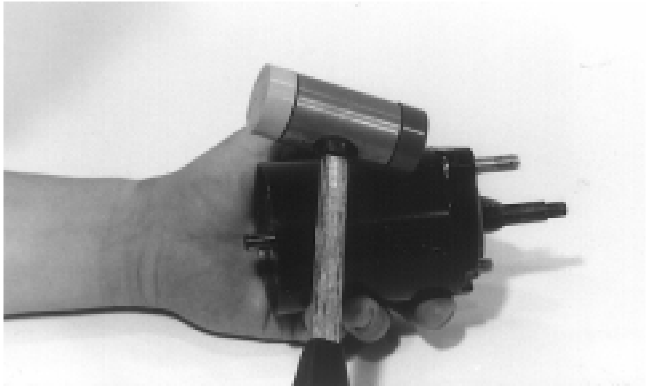
Fig. 5-62



AI026

4. Using a plastic hammer, tap the front starter cap free of the starter case and slide the cap free from the armature shaft. Account for any shim washers.

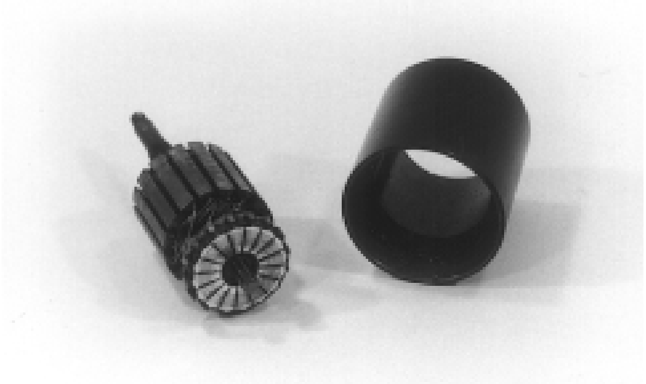
Fig. 5-63



AI027

5. Slide the armature free of the starter case.

Fig. 5-64

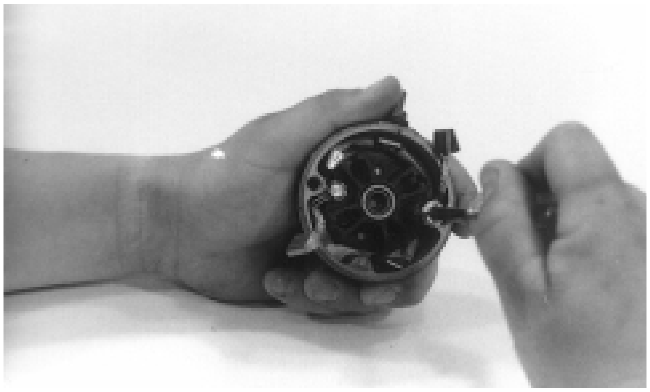


AI028

6. Lift all brushes from the brush holder and account for the four brush springs.

7. Using a 5/16-in. socket, remove the two cap screws securing the ground brushes to the end cap. Remove the brushes and brush holder from the end cap.

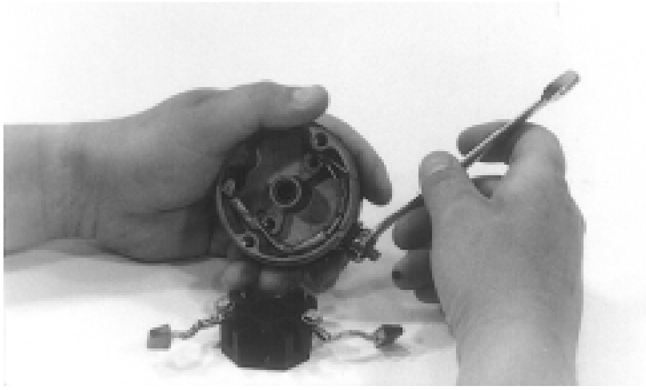
Fig. 5-65



AI036

8. Using a 7/16-in. wrench, remove the nut securing the cable stud to the end cap. Account for the lock washer, flat washer, and fiber washer.

Fig. 5-66



AI037

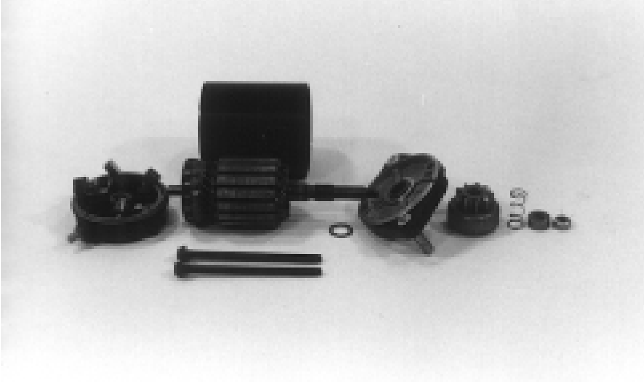
9. While holding the brush wires, pull the stud from the end cap. Account for the plastic insulator.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Thoroughly clean all components except the armature and brushes in parts-cleaning solvent; then dry with compressed air.

Fig. 5-67



AI029

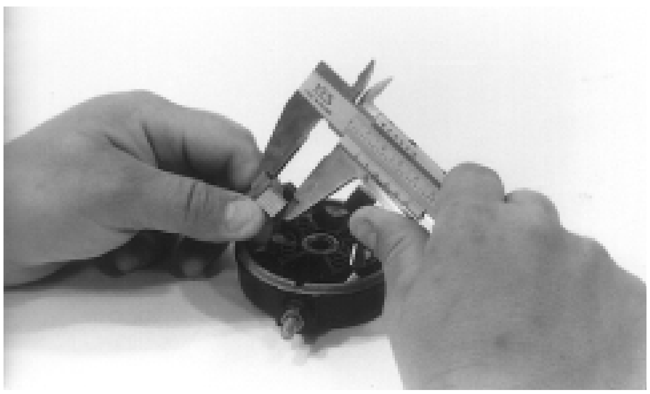
⚠ CAUTION

Do not wash the armature and brushes in any kind of solvent. Use only compressed air and clean dry cloth in cleaning these components.

2. Inspect all threaded areas for damaged or stripped threads.

3. Inspect the brush holder assembly and brushes for damage or wear. Using a calipers, measure the length of the brushes. If brush measurement is less than 7.5 mm (0.30 in.), replace brushes as a set along with new brush springs.

Fig. 5-68

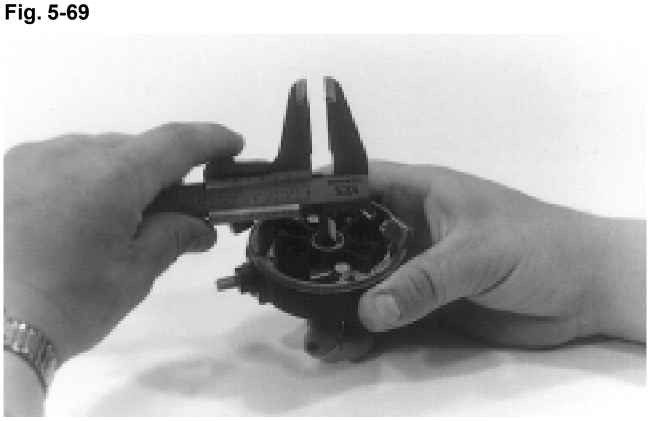


AI030

4. Inspect brush leads for cracks, wear, or fraying. If any of these conditions exist, replace the brushes as a set along with new brush springs.

5. Inspect the end-cap bushing for wear. Using a calipers, measure inner diameter at the end-cap bushing. If found to be 8.6 mm (0.338 in.) or larger, replace the end cap.

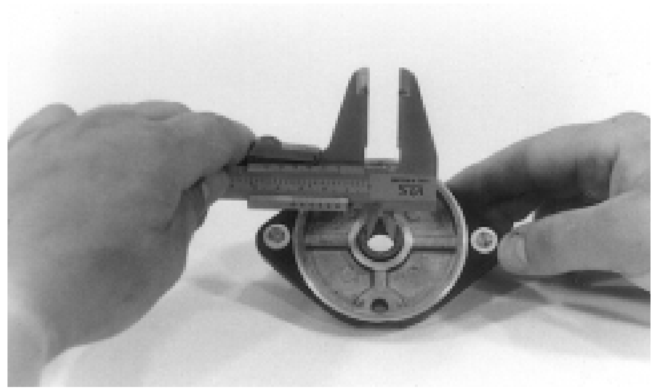
Fig. 5-69



AI031

6. Inspect the front-cap bushing for wear. Using a calipers, measure the inner diameter of the front-cap bushing. If found to be 13.2 mm (0.523 in.) or larger, replace the front cap.

Fig. 5-70



AI032

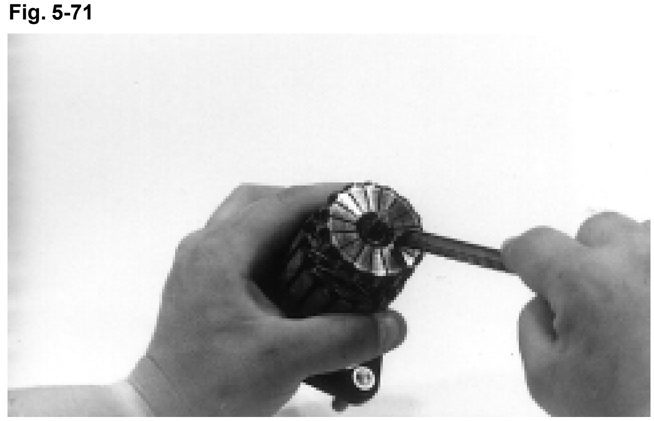
7. Inspect the brass commutator end of the armature for any burned spots or damage. If the commutator is slightly burned or damaged, the armature must be replaced. This is a molded commutator and no attempt to turn it down in a lathe should be tried.

⚠ CAUTION

Do not use emery cloth to clean the commutator as emery particles will become imbedded in the brass commutator resulting in a short circuit. Use only #00 grit sandpaper.

8. Inspect the commutator end for buildup in the grooves. Buildup in the grooves must be removed to prevent any chance of arcing between individual sections of the commutator. Carefully remove any buildup using a thinly ground hacksaw blade. Do not cut any deeper than the original groove which can be seen by looking at the commutator from the side.

Fig. 5-71



AI033

■ NOTE: After cleaning any buildup from the commutator, use compressed air to clean.

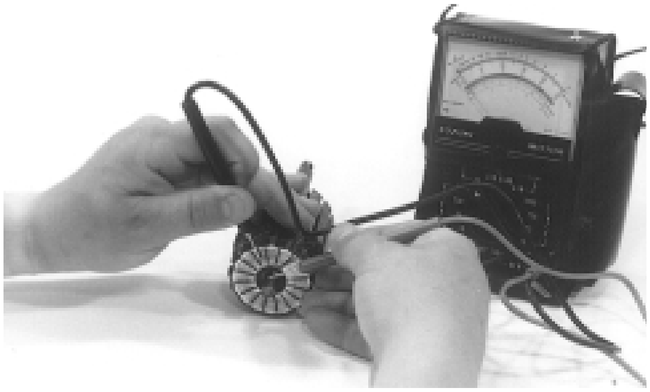
9. Inspect the armature for shorting. Use the multitester and the following procedure:

   A. Set the selector on the X1K position; then touch the leads and zero the meter.

B. Touch the black tester lead to the armature shaft.

C. Using the red tester lead, probe the commutator end of the armature. The meter indictator should not move. If the indicator needle moves, the armature must be replaced.

Fig. 5-72



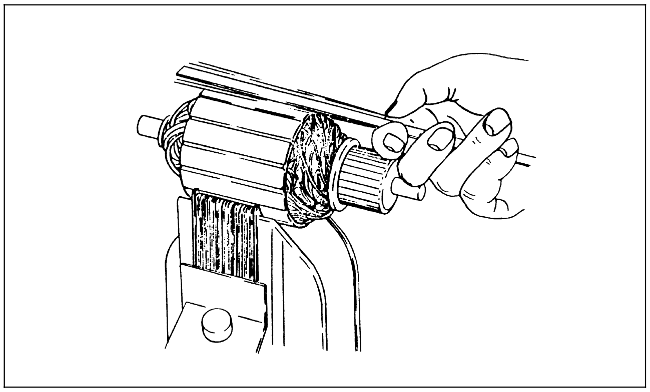
AI034

10. Inspect the armature for shorting. Use a "growler" and the following procedure:

A. Place the armature in the "growler."

B. While holding a metal strip over the armature, rotate the armature an entire revolution. If the metal strip vibrates at any point on the armature, the armature is shorted and must be replaced.

Fig. 5-73



0725-653

11. Inspect the ground brushes to make sure they are properly grounded. Use the multitester and the following procedure:

A. Set the selector on the X1K position; then touch the leads and zero the meter.

B. Touch the black tester lead to a ground brush.

C. Touch the red tester lead to the end cap. The meter needle should move to the right. If the needle does not move to the right, check that the ground connection is tight and clean. Recheck for proper ground. If there still isn't any meter needle movement, replace the brushes as a set along with new brush springs.

Fig. 5-74

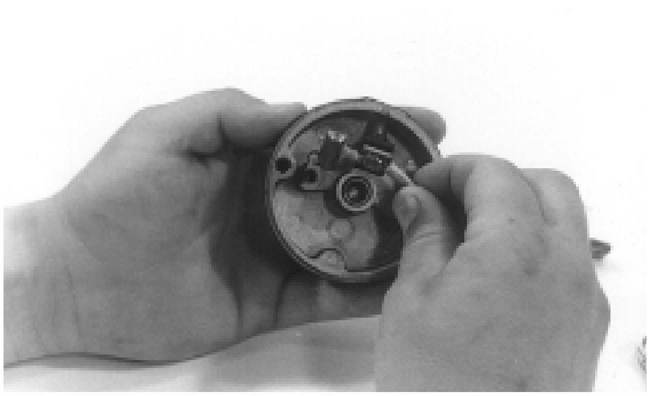


AI035

ASSEMBLING

1. Install the stud with the positive brush set attached in the end cap. Make sure the insulator is in position over the stud and the longest brush lead is positioned to the right of the stud hole.

Fig. 5-75



AI038

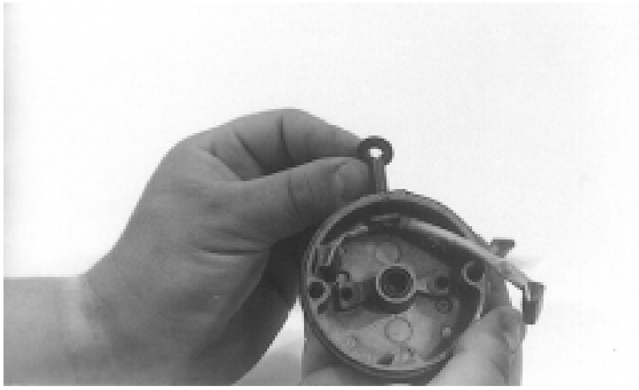
⚠ CAUTION

Check the stud to make sure insulator is between stud and cap on backside.

2. In order, place the fiber washer, flat washer, and lock washer on the stud. Apply a small amount of red Loctite #271 to the stud threads and secure with the nut. Tighten to 0.7 kg-m (5 ft-lb).

5

Fig. 5-76



AI039

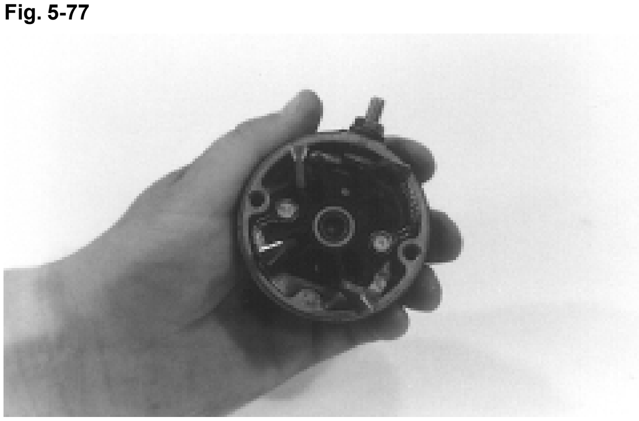
3. Place the brush holder into position in the end cap.

■ **NOTE: Position the longest positive brush lead beneath the ground wire on right side.**

4. Place a cap screw through the left ground brush lead eyelet and position the eyelet flat against the brush holder. Secure with a cap screw.

5. Place the right ground brush eyelet flat against the brush holder and secure with a cap screw. The eyelet stem must be positioned to the top of the threaded hole boss in the end cap.

Fig. 5-77



AI040

6. Place the four brush springs into the brush holder and place each brush (flat side down) on top of the springs.

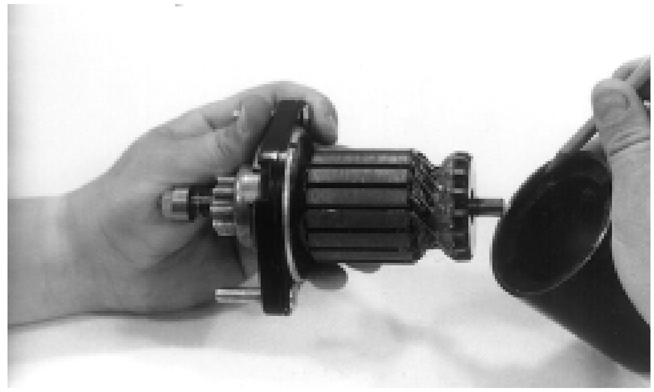
■ **NOTE: Apply a small amount of low-temperature grease to the end cap bushing and the front cap bushing.**

7. Place a wave washer and a thrust washer on the armature shaft; then slide the front cap into position.

8. Apply a thin coat of grease to the armature shaft and slide the drive gear and spring washer onto the shaft. Secure with a snap ring.

9. Start the commutator end of the armature assembly into the starter case at the end with the fields nearest the end of the housing. Align the marks on the front cap and case.

Fig. 5-78



AI042

10. Compress the four brushes (flat side down) into the brush holder. Hold the brushes in position using the Starter Assembly Tool (p/n 0644-052).

Fig. 5-79



AI043

11. Carefully place the starter case and armature assembly into the end cap. Again, check to make sure the scribed marks of these two components are aligned. With the case flat on the assembly tool, slowly pull the tool from the starter motor. The case should then drop into place.

Fig. 5-80



AI044

12. Apply red Loctite #271 to the threads of the two long bolts; then start the bolts down through the front cap and thread them into the end cap. Tighten to 1-1.4 kg-m (7-10 ft-lb).

■ **NOTE: The starter shouldn't be picked up until the two long bolts have been tightened. Spring pressure from the brush springs will push the end cap off the case.**

DISASSEMBLING PINION

1. Remove the pinion assembly from the end cap. Account for a wave washer, thrust washer, and spacer.
2. Press in on the pinion stop and remove the snap ring.
3. Remove the stopper, spring, and pinion gear from the shaft.

CLEANING AND INSPECTING PINION

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Using parts-cleaning solvent, wash grease from the pinion gear. Dry with compressed air.
2. Inspect the pinion gear for wear. If the gear is worn or chipped, replace the pinion assembly.
3. Inspect the inner spiral gear and housing. If the spiral gear shows any signs of wear, replace the pinion assembly.
4. Inspect the inner housing for tightness and cracks. If the housing shows any signs of being loose or cracked, replace the pinion assembly.
5. Inspect the pinion return spring for wear. If the spring shows any worn areas, replace the spring.

ASSEMBLING/INSTALLING PINION

1. Apply a thin coat of grease to the spiral gear; then slide the pinion onto the driveshaft along with the return spring and stopper.
2. Slide the spacer, thrust washer, wave washer, and thrust washer onto the driveshaft and slide the assembled pinion gear assembly into the end cap. Slide the remaining thrust washer onto the bracket side of the driveshaft.
3. Secure the assembled end cap to the mounting bracket with the machine screw.

TESTING STARTER MOTOR

■ **NOTE: Before installing the starter motor, perform test to ensure proper operation using the following procedure.**

1. Attach a black jumper cable to a good ground on the starter.
2. Attach the opposite end of the black jumper cable to the negative post of a good 12V battery.
3. Attach the red jumper cable to the positive post of the battery.
4. Holding the starter firmly down on a work bench, touch the red jumper cable to the positive cable stud of the starter.

⚠ WARNING

Be sure to keep clear of the pinion gear area as it will spin at a high RPM when the red cable is touched to the positive stud. Personal injury may result if contact is made with a spinning pinion.

■ **NOTE: Starter motor must instantly spin at a high RPM. The pinion must snap out against the stopper. If the motor does not spin, remove the red cable immediately. Check the battery condition and all connections. If everything checks out satisfactorily and the starter does not spin, disassemble the motor and check for pinched or broken wires.**

INSTALLING

1. Place the starter motor into the bracket; then secure with two washers and lock nuts. Tighten to 1.7-2.1 kg-m (12-15 ft-lb).
2. Attach the red positive cable to the positive stud terminal and secure with a nut and lock washer. While tightening the nut, hold the cable in position so it is parallel with the starter.

⚠ CAUTION

Check the cable installation to make sure it isn't near any moving parts or against any sharp edges.

3. Secure the positive cable to the starter motor with a long cable tie.
4. Connect the cable to the positive post of the battery; then connect the negative cable to the negative post.
5. Install the drive clutch (see Section 8).
6. Install the PTO-side and center expansion chambers.

Troubleshooting Electric Start

Problem: Hot or Smoking Wires	
Condition	**Remedy**
1. **System** wired incorrectly	1. Check wiring against wiring diagram

Problem: Starter Does Not Turn Over	
Condition	**Remedy**
1. **Battery** discharged	1. Check/charge the battery
2. **Connection** loose	2. Check tightness of all connections
3. **Grounding** improper	3. Check ground connections
4. **Fuse** blown—not installed	4. Check—replace fuse

Wire Color Code and Function Description

■ **NOTE: The following wire color code and function description will assist in using the Main Harness and Hood Harness wiring diagrams (see Section 6). Note that some colors are numbered. When a numbered color appears on either of the wiring diagrams, refer to this color code description page, and it will provide you with additional information.**

COLOR	FUNCTION — DESCRIPTION
Brown	**Electrical Common; Chassis Ground**
	The brown wire is connected to the chassis at the engine stator plate and also through the voltage regulator chassis bolt (prior to 1989, the taillight harness also had a chassis connection). The headlight bracket is grounded on some models to reduce the bracket RFI emissions. All brown wires are common ground.
Yellow	**AC Power; 13 Volts AC (Alternating Current)**
	The yellow wire is connected to the engine stator plate lighting coil and the voltage regulator. The voltage produced by the lighting coil is very engine RPM dependent. The voltage regulator is necessary to maintain 13.5 VAC on the yellow wire whenever the engine exceeds about 3000 RPM. All yellow wires are 13 VAC. The signal on the yellow wire is AC. Not only is the voltage level of this signal RPM dependent, but the signal frequency (cycles per second) is RPM dependent as well. The electric tachometer uses this changing frequency phenomenon to indicate the engine RPM. An electric tachometer will operate properly when connected to any yellow (13 VAC) and brown (common ground) wire pair.
White	**Headlight Low Beam**
	The white wire connects the dimmer switch to the headlight bulb. The low beam filament will illuminate when the dimmer switch connects the white wire to 13 VAC power.
Blue	**Headlight High Beam and Indicator Light**
	The blue wire connects the dimmer switch to the headlight bulb. The high beam will illuminate when the dimmer switch connects the blue wire to 13 VAC power. Some models use a tachometer with a high beam indicator light. The high beam indicator light will also illuminate when the dimmer switch connects the blue wire to 13 VAC power.
Green	**Handlebar Warmer Indicator Light**
	Some models use a tachometer with a handlebar warmer indicator light. The green wire connects the handlebar warmer switch to the "warmer" indicator light. The "warmer" light will illuminate when the handlebar warmer switch connects the green wire to common ground.

COLOR	FUNCTION — DESCRIPTION
Violet or Black (NOI)	**Ignition System "Shut-Off"**
	The violet or black wire connects the ignition system CDI module to the throttle control switches. Ignition spark is interrupted when any of the switches close, connecting the violet or black wire to a common ground.
Black/Red	**Ignition System "Shut-Off"**
	The black/red wire connects the throttle control switches to the ignition switch. "Spark" occurs when the black/red is at a common ground level and "spark" stops when the black/red wire is open (not connected to common ground).
Red/White #1	**High Temperature Warning Light**
	Some models use a speedometer with a high temperature warning light. The red/white #1 wire connects the high temperature sensor to the temperature warning light. The "temp" light will illuminate when the sensor connects the red/white #1 wire to common ground.
Red/White #2	**Solenoid Coil Power**
	The red/white #2 wire connects the ignition switch (12 volt DC) power to the solenoid. The solenoid will activate when the ignition switch connects the red/white #2 wire to the + 12 VDC battery power.
Red #1	**Brakelight**
	The red #1 wire connects the brake control assembly switch to the brakelight filament. The brakelight will illuminate when the brake switch connects the red #1 wire to 13 VAC power.
Red #2	**Electric Start Battery Power; 12 Volts DC (Direct Current)**
	The red #2 wire connects the battery positive post (+12 VDC) to the ignition switch through the fuse holder. All electric start red #2 wires are +12 VDC. If the fuse "blows," all red #2 wires are disconnected from the battery and battery charging (via the charging diode) discontinues until the fuse is replaced.
Red #3	**Low Oil Warning Light**
	The red #3 wire connects the low oil sensor to the "oil" warning light. The "oil" light will illuminate when the sensor connects the red #3 wire to 13 VAC power.
Gray	**Electric Fuel Level Gauge**
	Some models are equipped with an electric fuel level gauge. The gray wire connects the in-tank resistive sensor to the gauge. As the fuel level rises, the sensor resistance decreases, and the gauge needle rises; conversely, as the fuel level goes down, the sensor resistance increases, and the gauge needle drops.
Orange	**Reverse Alarm**
	Some models are equipped with a reverse gear and reverse alarm. The orange wire connects the reverse switch to the reverse alarm. The reverse alarm will "beep" when the switch connects the orange wire to 13 VAC power.

Ignition Timing

CHECKING

1. Connect a timing light to the MAG-side spark plug lead.

2. Using a shielded safety stand, raise the rear of the snowmobile off the floor and start the engine. Gradually increase the engine speed to the specified RPM; the pointer should align with the proper timing mark on the flywheel.

3. If timing is not correct, adjust the ignition timing.

ADJUSTING

1. Remove the recoil starter, starter pulley, and flywheel.

2. Loosen the two screws securing the stator plate and rotate the stator plate in the proper direction to attain correct timing.

■ **NOTE: Rotate the stator plate clockwise to retard the timing or counterclockwise to advance the timing. The stamped marks on the stator plate at the upper socket-head cap screw mounting hole can be used for timing.**

3. Tighten the screws securing the stator plate.

4. Install the flywheel, starter pulley, and recoil starter.

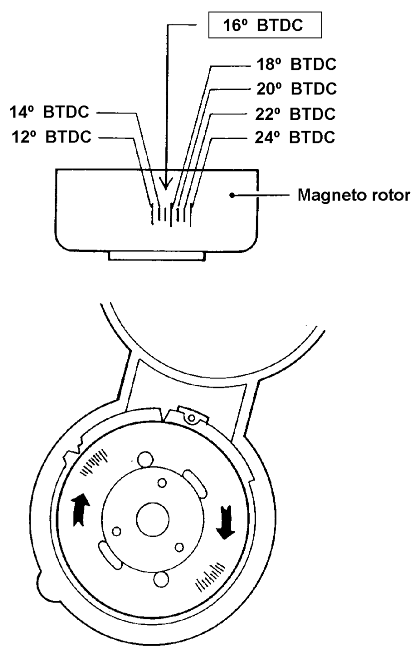
5. Affirm timing for accuracy and adjust if necessary.

Ignition Timing Specifications

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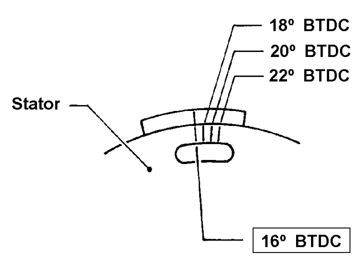
340 cc 5-53
370 cc 5-54
440 cc F/C 5-54
440 cc L/C 5-55
550 cc 5-55
580 cc EFI 5-56
500 cc (Carbureted) 5-56
500 cc EFI 5-57
600 cc (Triple) 5-57
800 cc 5-58
600 cc EFI 5-58
600 cc (Twin-Carbureted) 5-59
700 cc 5-59
1000 cc 5-60

340 cc



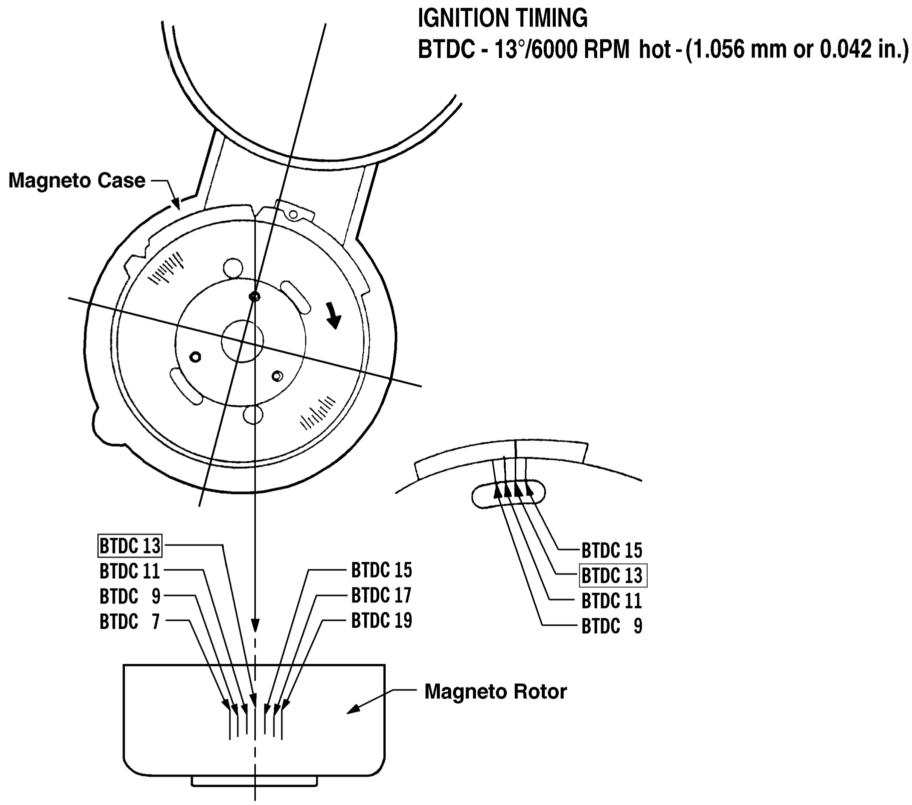
Mag. Rotor/Housing Assembly

Ignition Timing
BTDC-16°/6000 RPM hot - 1.440 mm (0.056 in.)



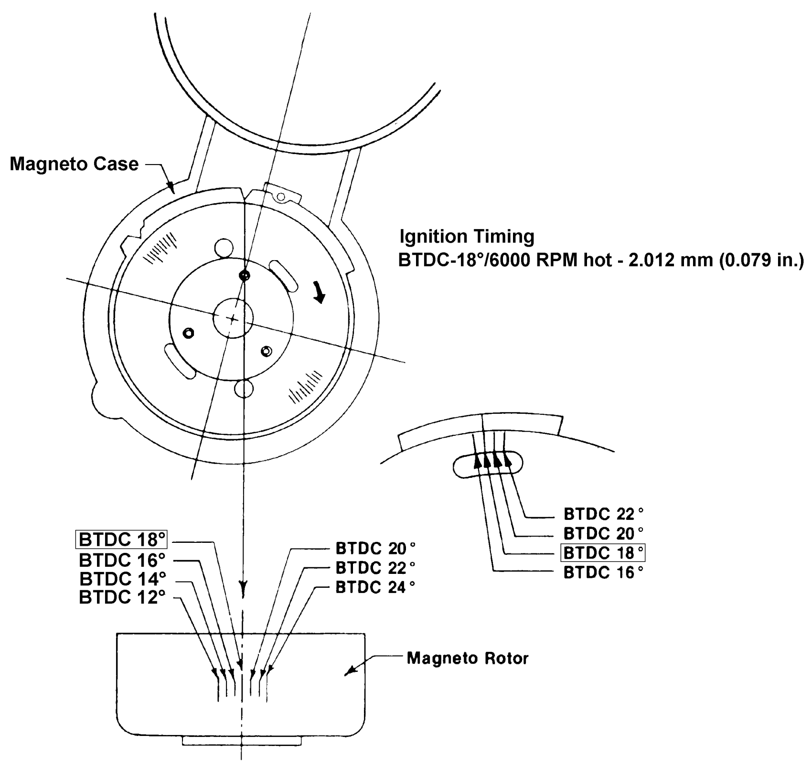
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370 cc



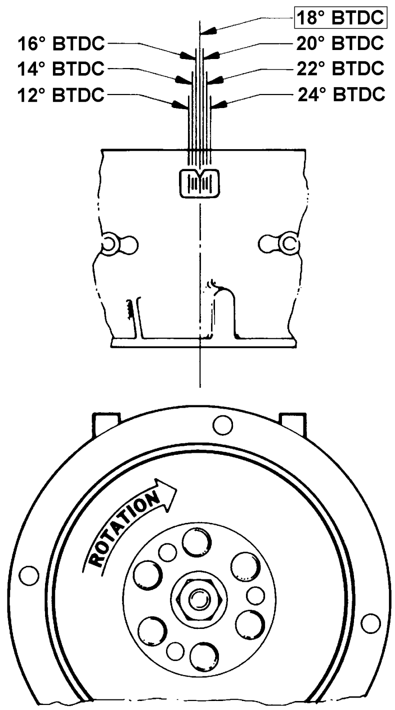
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440 cc F/C

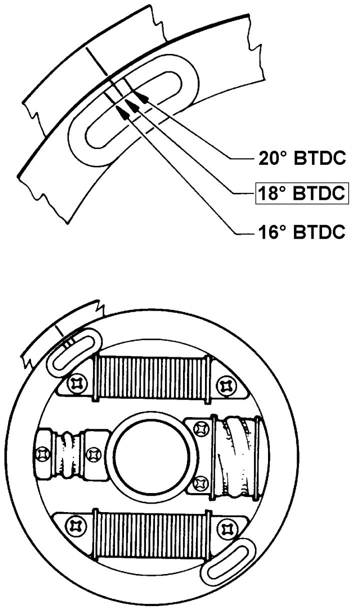


0726-863

440 cc L/C

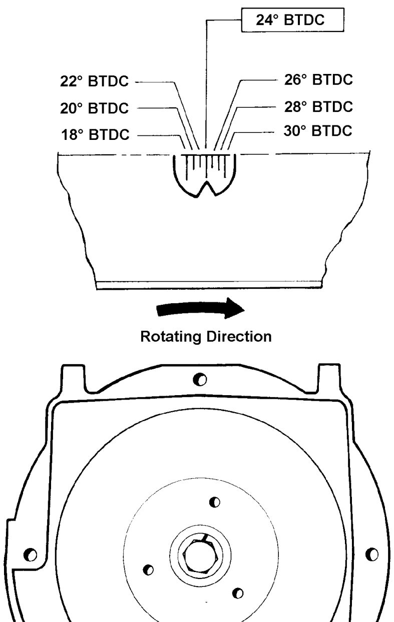


IGNITION TIMING
BTDC - 18°/6000 RPM hot - (1.860 mm or 0.073 in.)



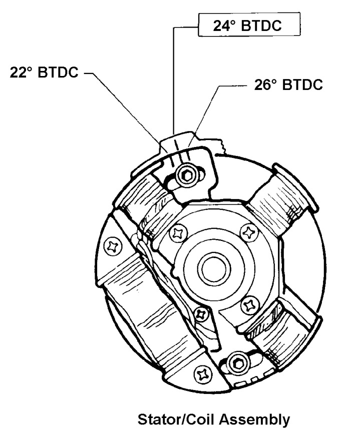
0728-165

550 cc



Mag. Rotor/Housing Assembly

IGNITION TIMING
BTDC - 24°/6000 RPM hot - (3.540 mm or 0.139 in.)

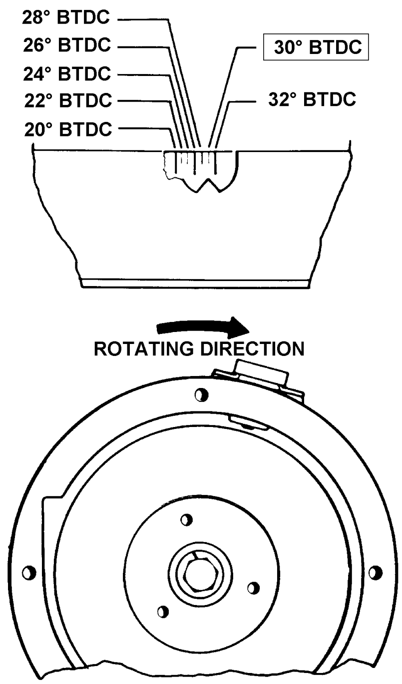


Stator/Coil Assembly

0730-215

5

580 cc EFI



MAG. ROTOR / HOUSING ASSEMBLY

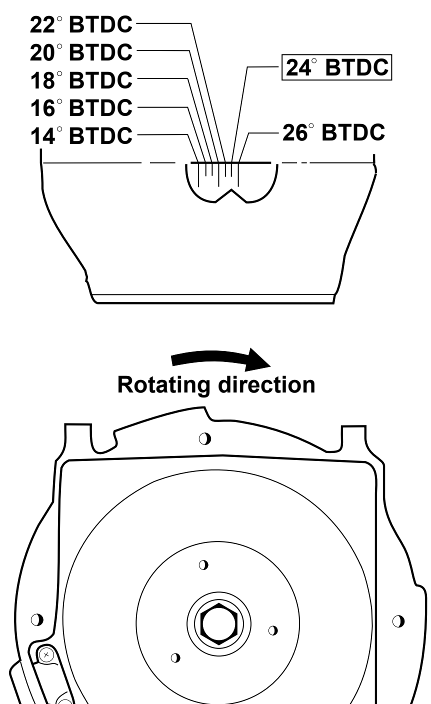
IGNITION TIMING
BTDC - 30°/4000 RPM - (5.459 mm or 0.215 in.)

732-629A

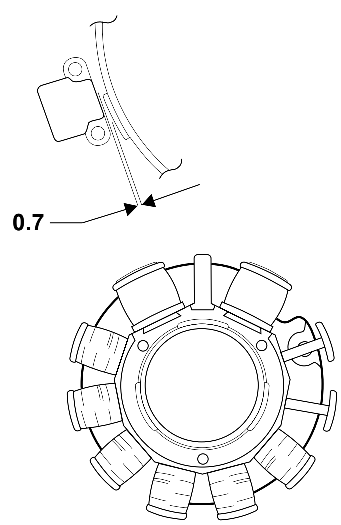
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500 cc (Carbureted)

IGNITION TIMING
BTDC - 24°/3500 RPM - (3.390 mm or 0.133 in.)



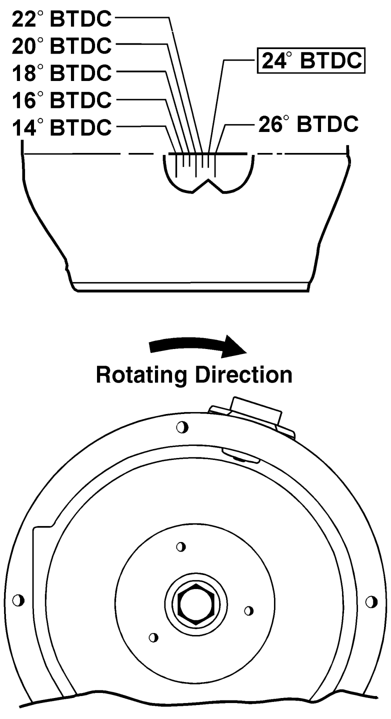
Mag. Rotor/housing assembly



Stator/coil assembly
(no timing adjustment required)

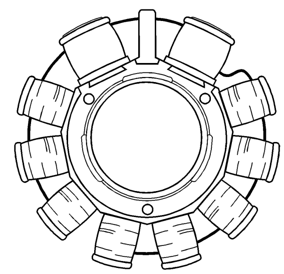
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500 cc EFI



Mag. Rotor/Housing Assembly

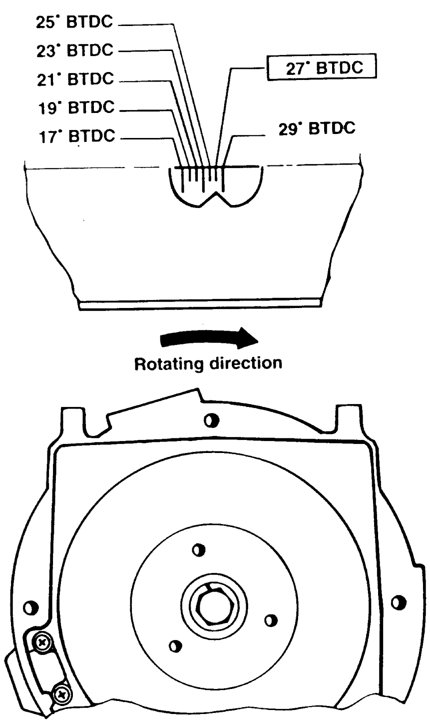
IGNITION TIMING
BTDC - 24°/3500 RPM - (3.390 mm or 0.133 in.)



Stator/Coil Assembly
(no timing adjustment required)

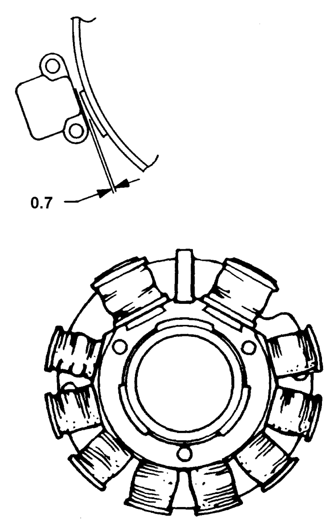
0734-459

600 cc (Triple)



Mag. Rotor/Housing Assembly

IGNITION TIMING
BTDC - 27°/4000 RPM - (3.884 mm or 0.153 in.)



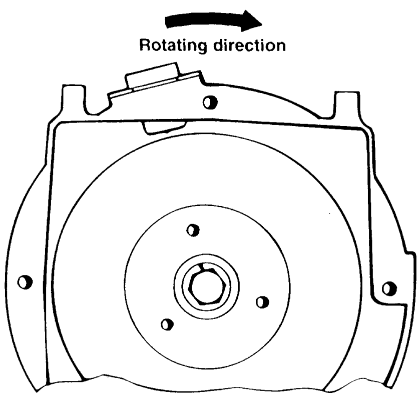
Stator/coil assembly
(no timing adjustment required)

0732-631

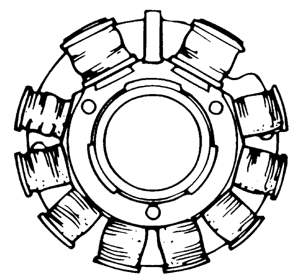
800 cc

■ NOTE: For timing purposes on the 800 cc, use a dial indicator and scribe a mark on the flywheel for 12° BTDC.

IGNITION TIMING
BTDC-12°/1800 RPM - (0.086 mm or 0.035 in.)



Mag. Rotor/Housing Assembly

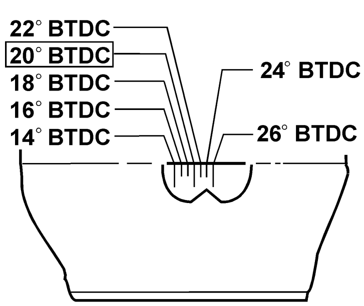


Stator/Coil Assembly
(no timing adjustment required)

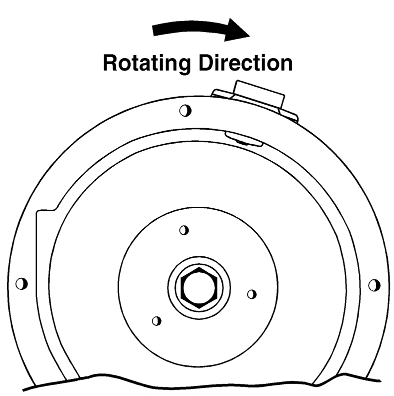
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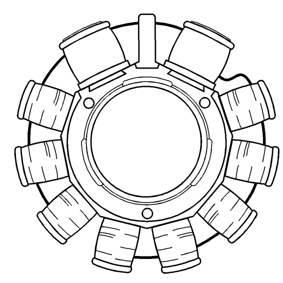
600 cc EFI



IGNITION TIMING
BTDC - 20°/5000 RPM - (2.371 mm or 0.093 in.)



Mag. Rotor/Housing Assembly

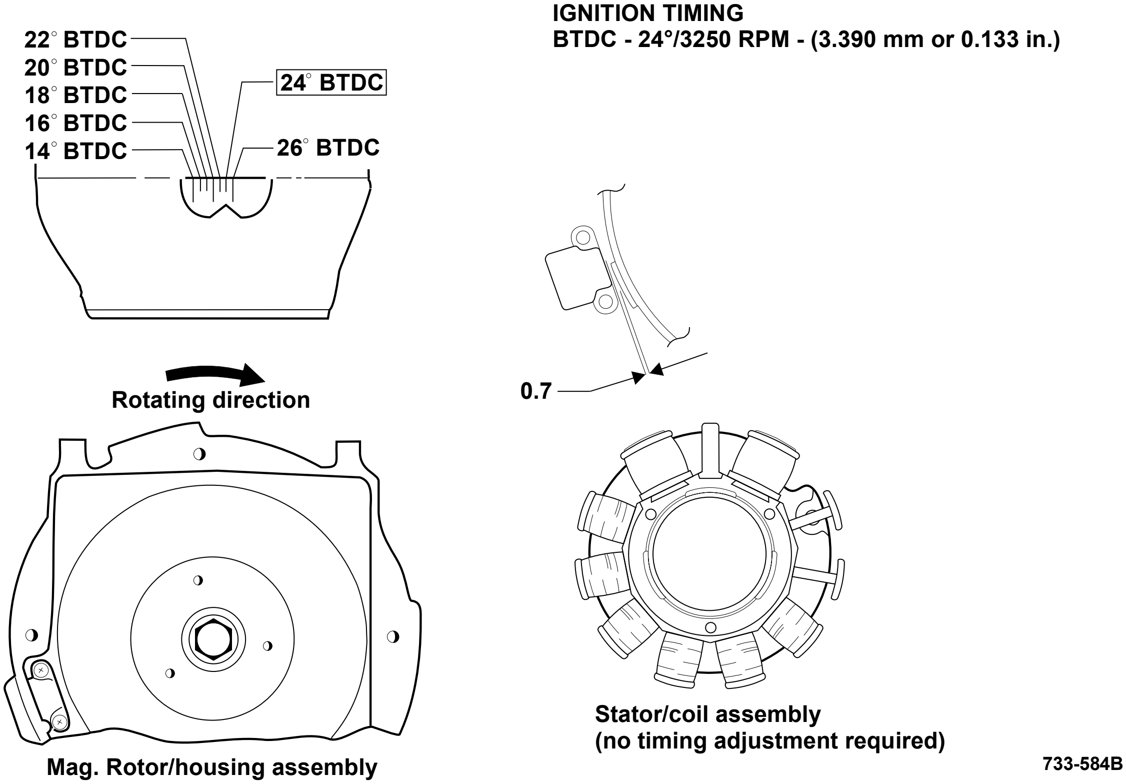


Stator/Coil Assembly
(no timing adjustment required)

0734-460

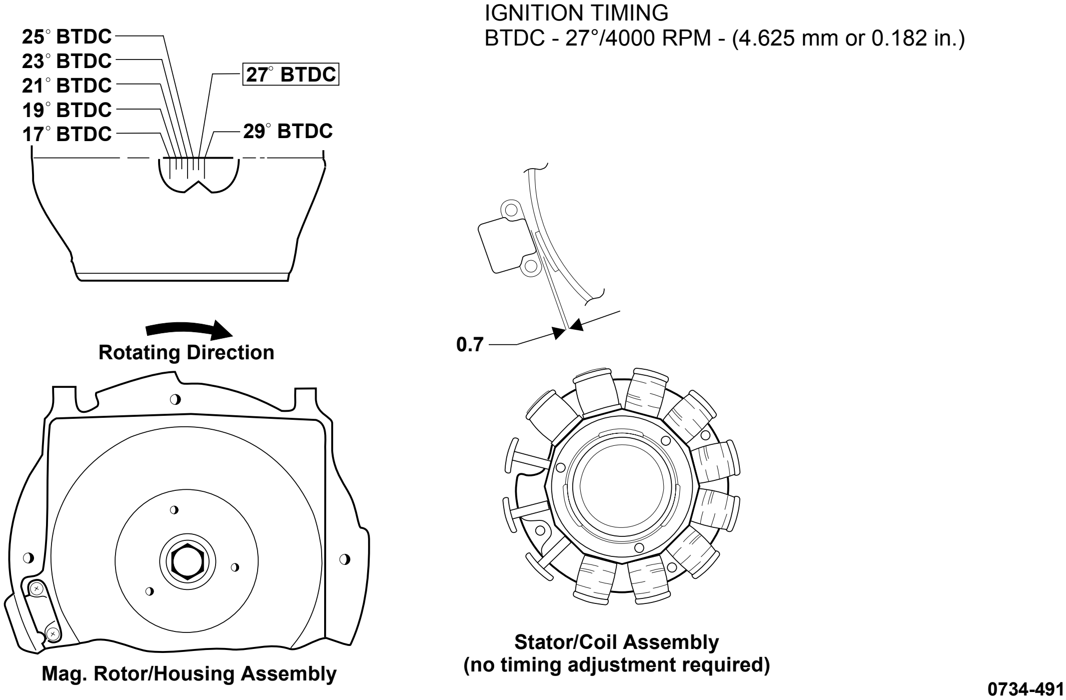
600 cc (Twin - Carbureted)

IGNITION TIMING
BTDC - 24°/3250 RPM - (3.390 mm or 0.133 in.)



700 cc

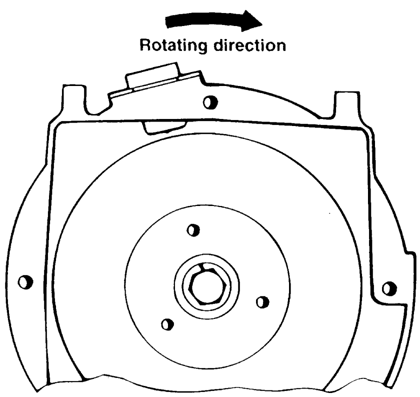
IGNITION TIMING
BTDC - 27°/4000 RPM - (4.625 mm or 0.182 in.)



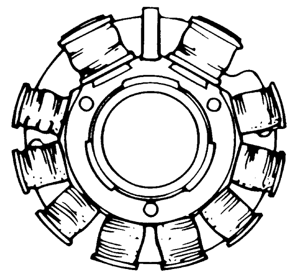
1000 cc

■ NOTE: For timing purposes on the 1000 cc, use a dial indicator and scribe a mark on the flywheel for 16° BTDC.

IGNITION TIMING
BTDC-16°/4000 RPM - (1.556 mm or 0.061 in.)



Mag. Rotor/Housing Assembly



Stator/Coil Assembly
(no timing adjustment required)

731-248G

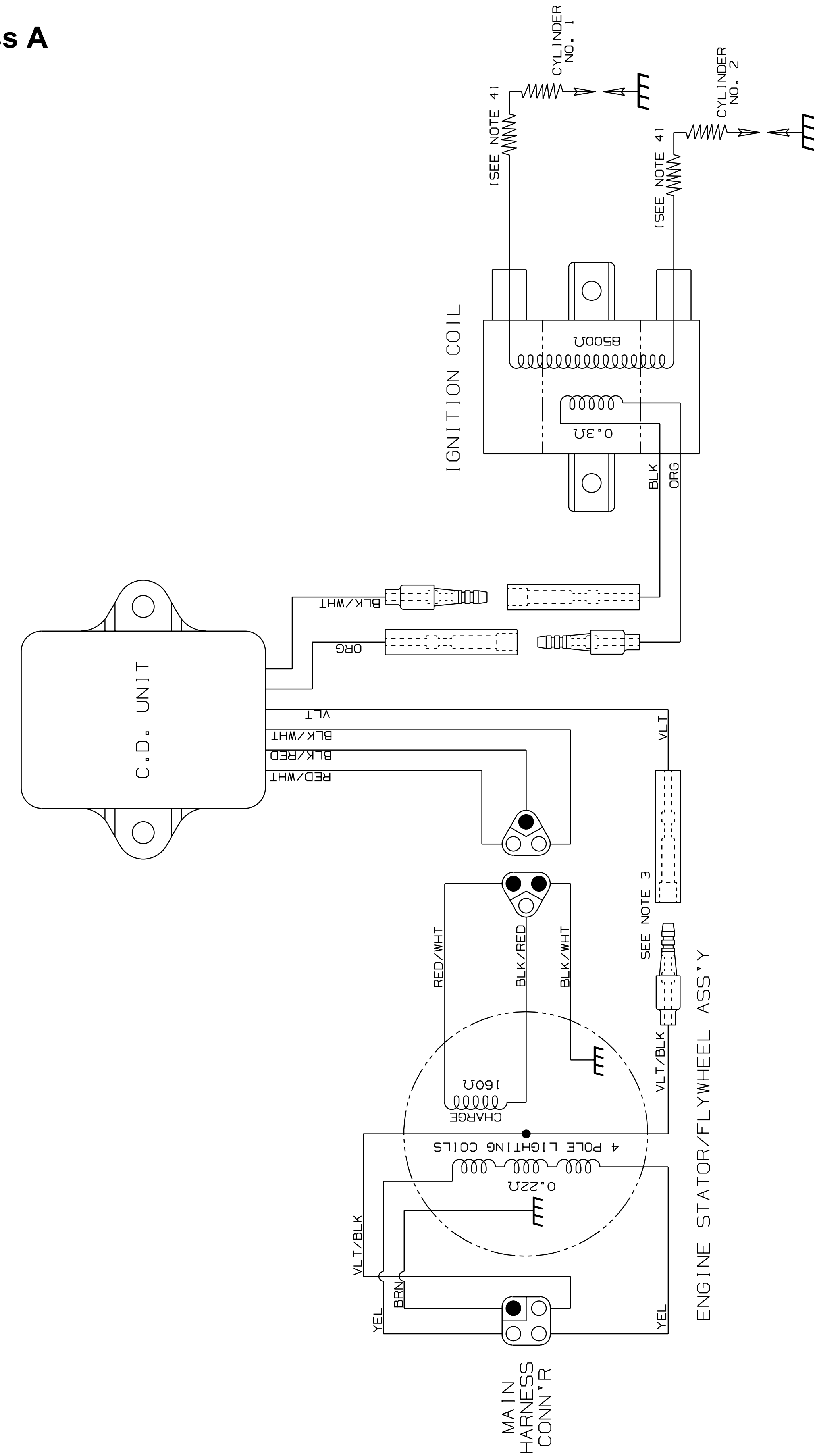
Wiring Diagram Index (Ignition)

This chart is designed to direct the technician to the appropriate Ignition Harness Wiring Diagram. Select the snowmobile model from the chart to determine the correct diagram.

Snowmobile Models	Ignition Harness
Bearcat 340	A
Bearcat 440 I	A
Bearcat 440 II	A
Bearcat W/T	B
Pantera 580 EFI	C
Pantera 1000	G
Panther 340	A
Panther 440	A
Panther 550	B
Powder Special 500 EFI	C
Powder Special 500 EFI LE	C
Powder Special 600	I
Powder Special 600 LE	I
Powder Special 600 EFI	J
Powder Special 600 EFI LE	J
Powder Special 700	H
Powder Special 700 LE	H
Thundercat	G
Thundercat M/C	G
Triple Touring 600	D

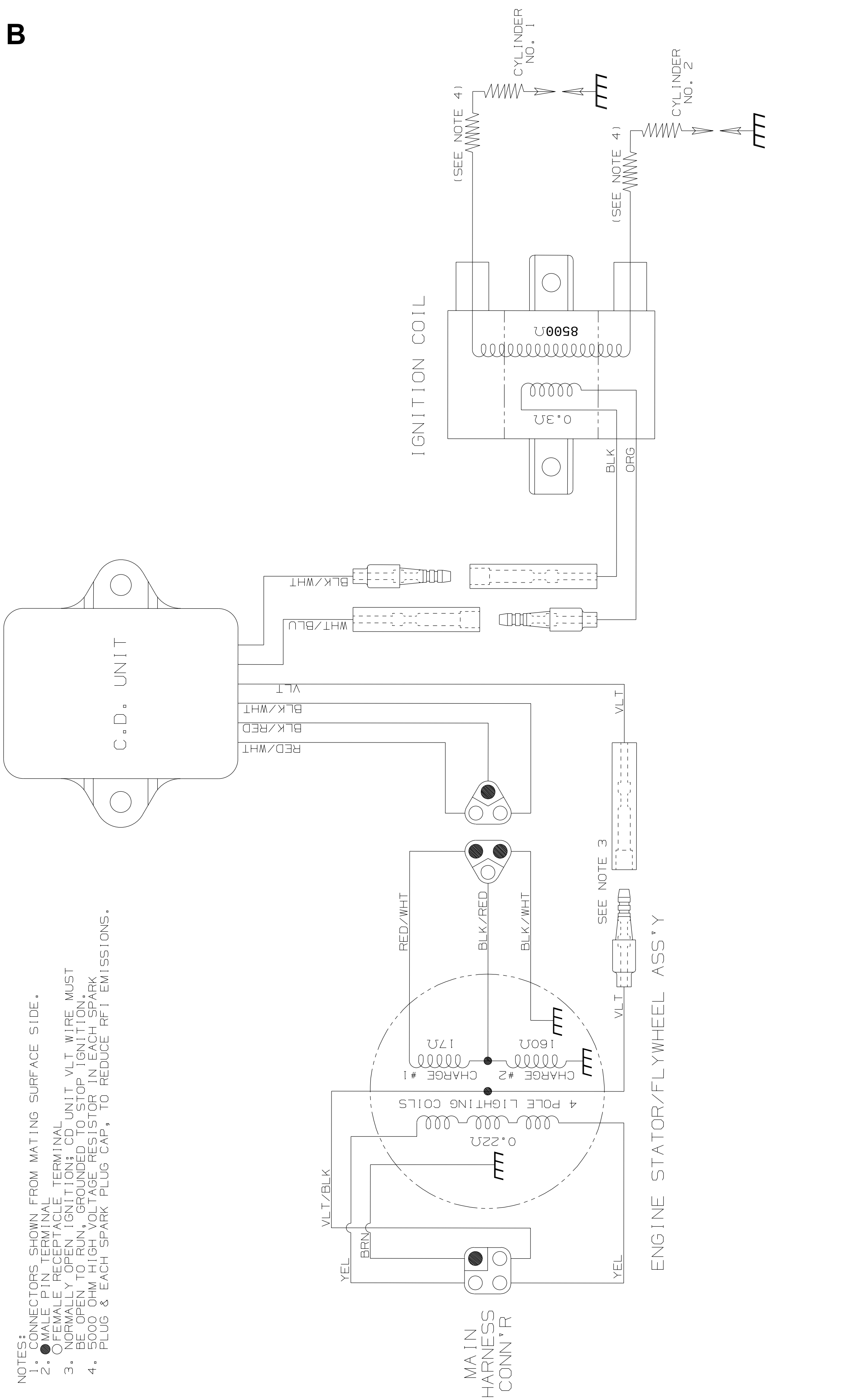
Snowmobile Models	Ignition Harness
Z 370	B
Z 440	B
ZL 440	E
ZL 500	F
ZL 500 EFI	C
ZL 550	B
ZL 580 EFI	C
ZL 600	I
ZL 600 EFI	J
ZL 700	H
ZR 500	F
ZR 500 EFI	C
ZR 600	I
ZR 600 EFI	J
ZR 600 EFI LE (Clicker)	J
ZR 600 EFI LE (Reverse)	J
ZR 700	H
ZR 700 LE (Clicker)	H
ZR 700 LE (Reverse)	H
ZRT 600	D
ZRT 800	G

Harness A



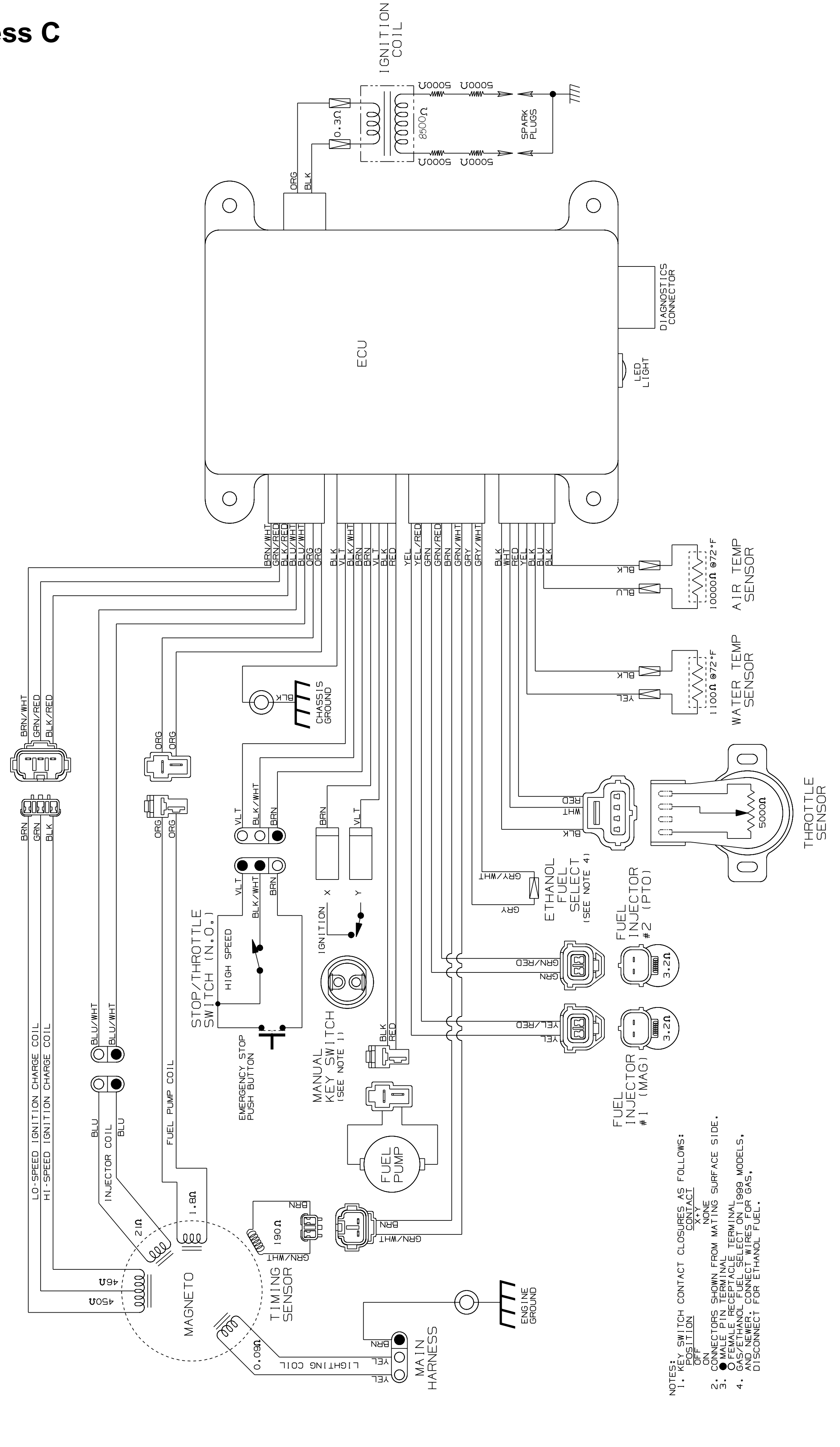
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Harness B



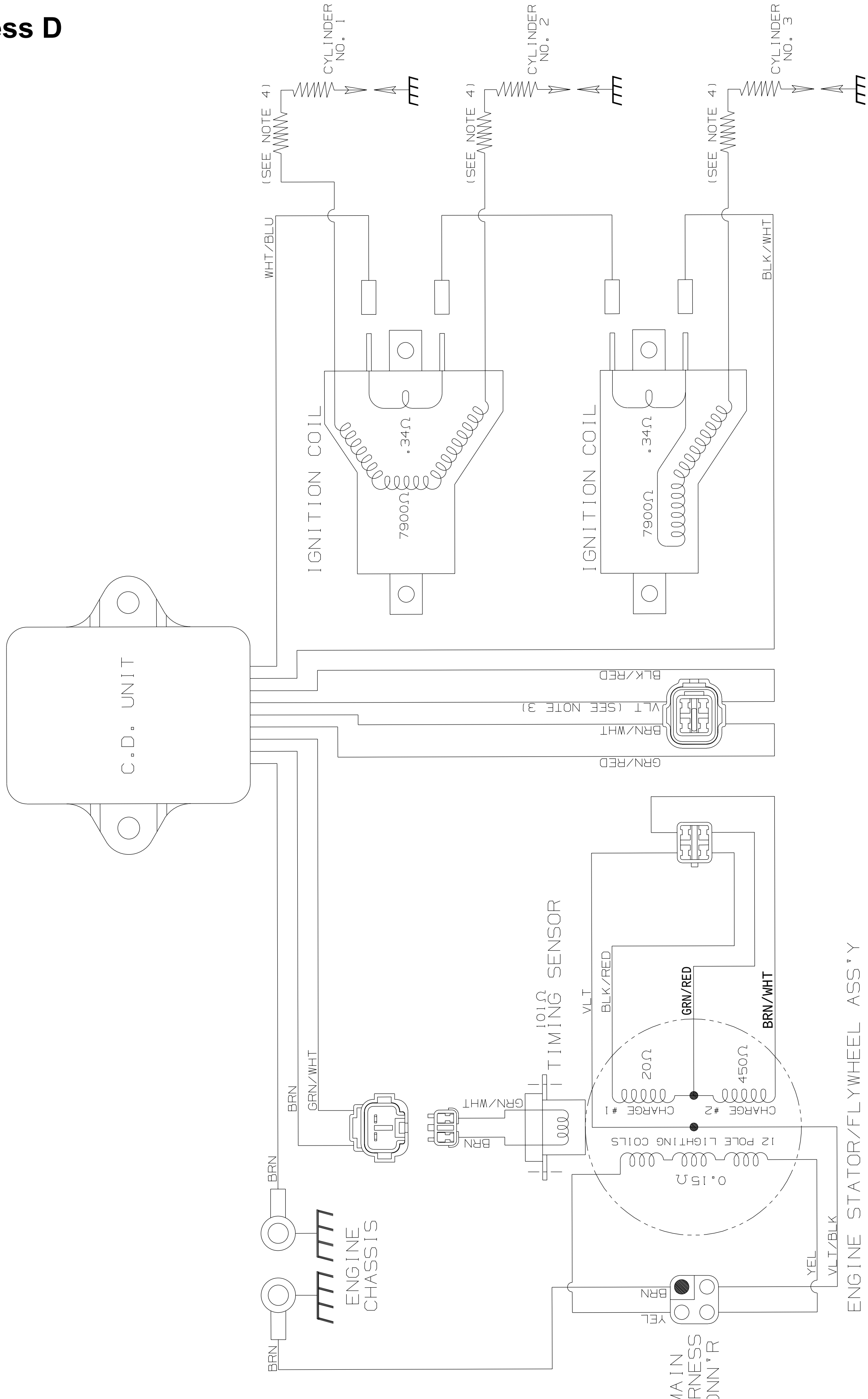
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Harness C



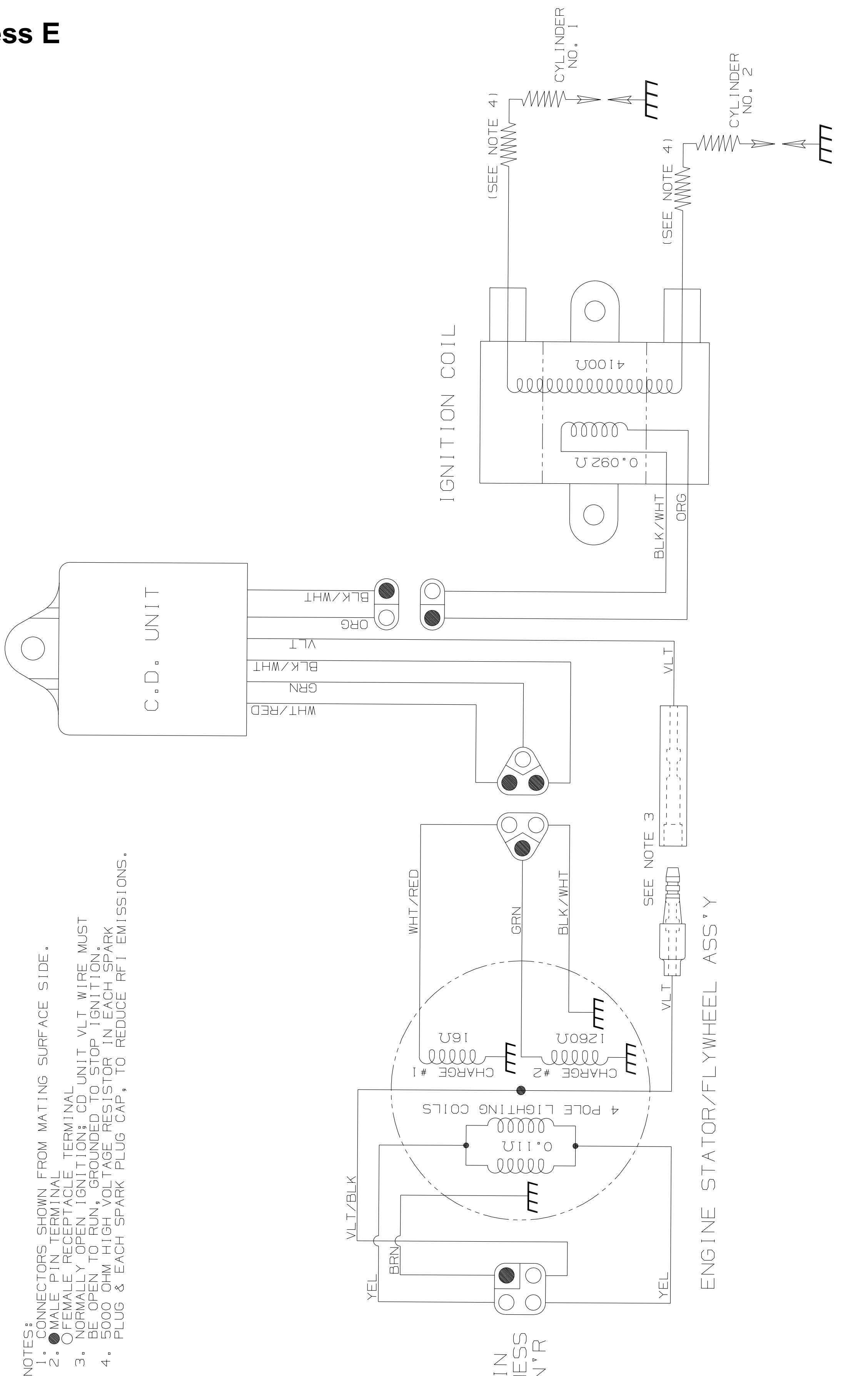
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Harness D



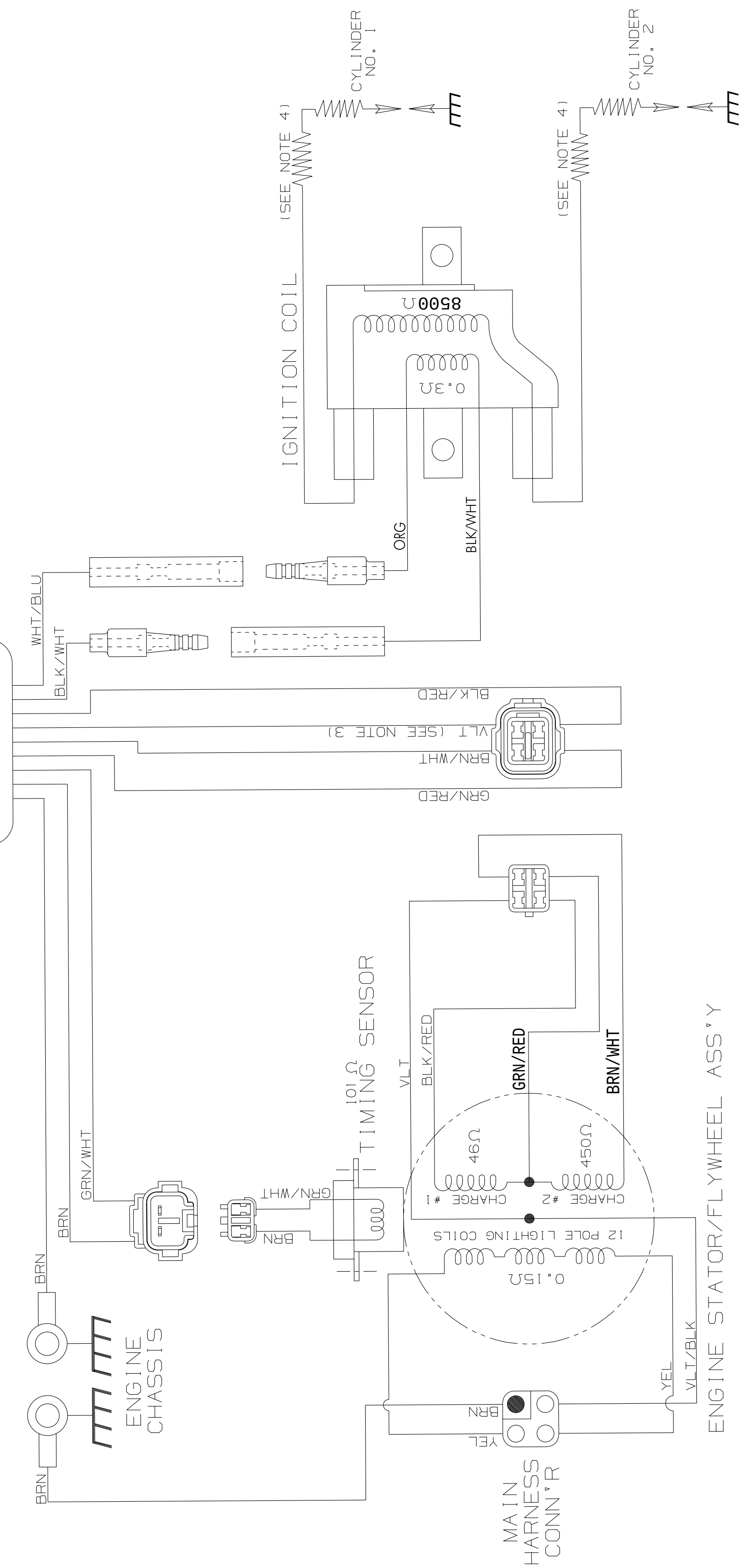
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Harness E



0686-556

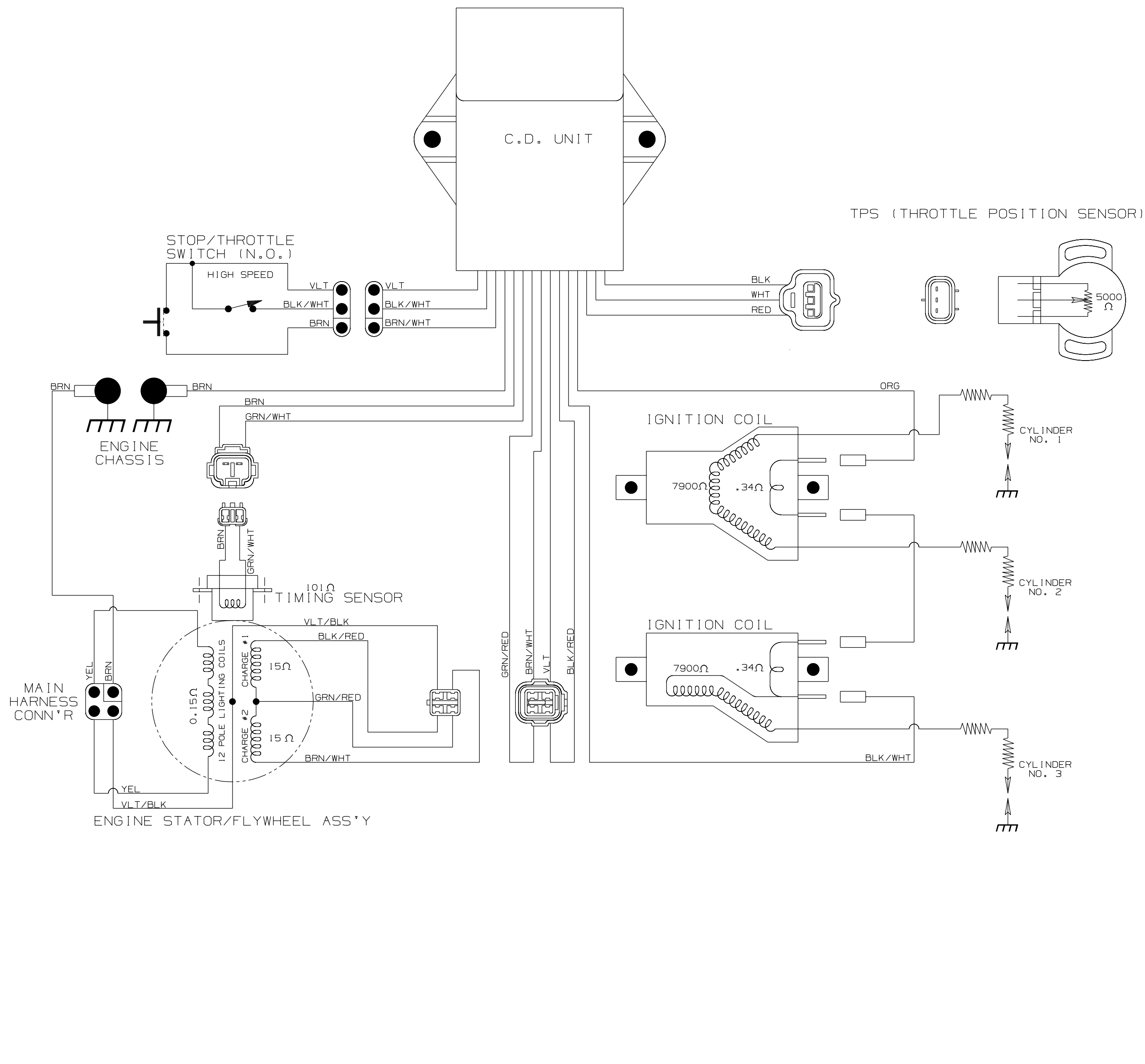
Harness F



NOTES:
1. CONNECTORS SHOWN FROM MATING SURFACE SIDE.
2. ● MALE PIN TERMINAL
○ FEMALE RECEPTACLE TERMINAL
3. NORMALLY OPEN IGNITION; CD UNIT VLT WIRE MUST BE OPEN TO RUN, GROUNDED TO STOP IGNITION.
4. 5000 OHM HIGH VOLTAGE RESISTOR IN EACH SPARK PLUG & EACH SPARK PLUG CAP, TO REDUCE RFI EMISSIONS.

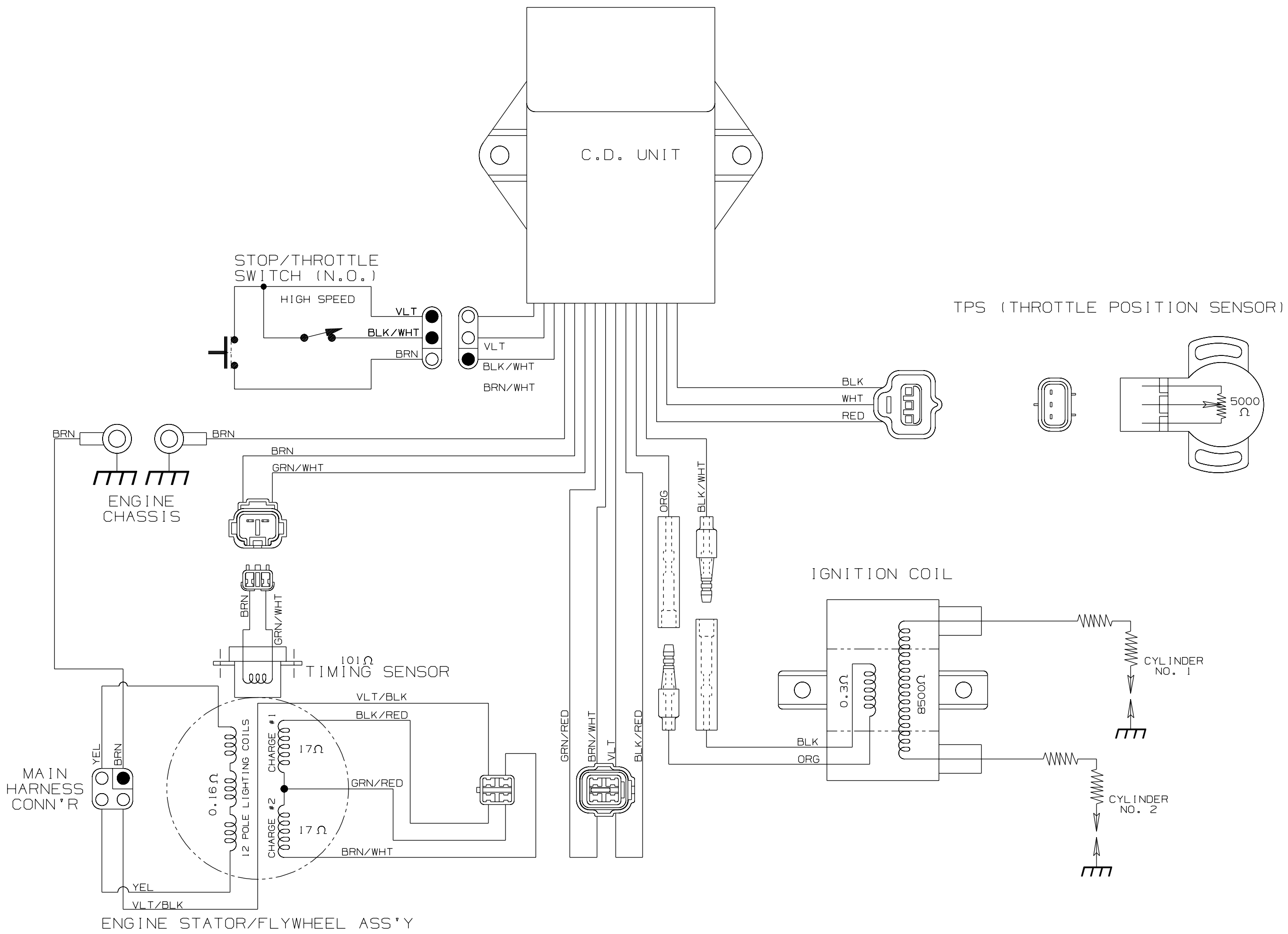
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Harness G



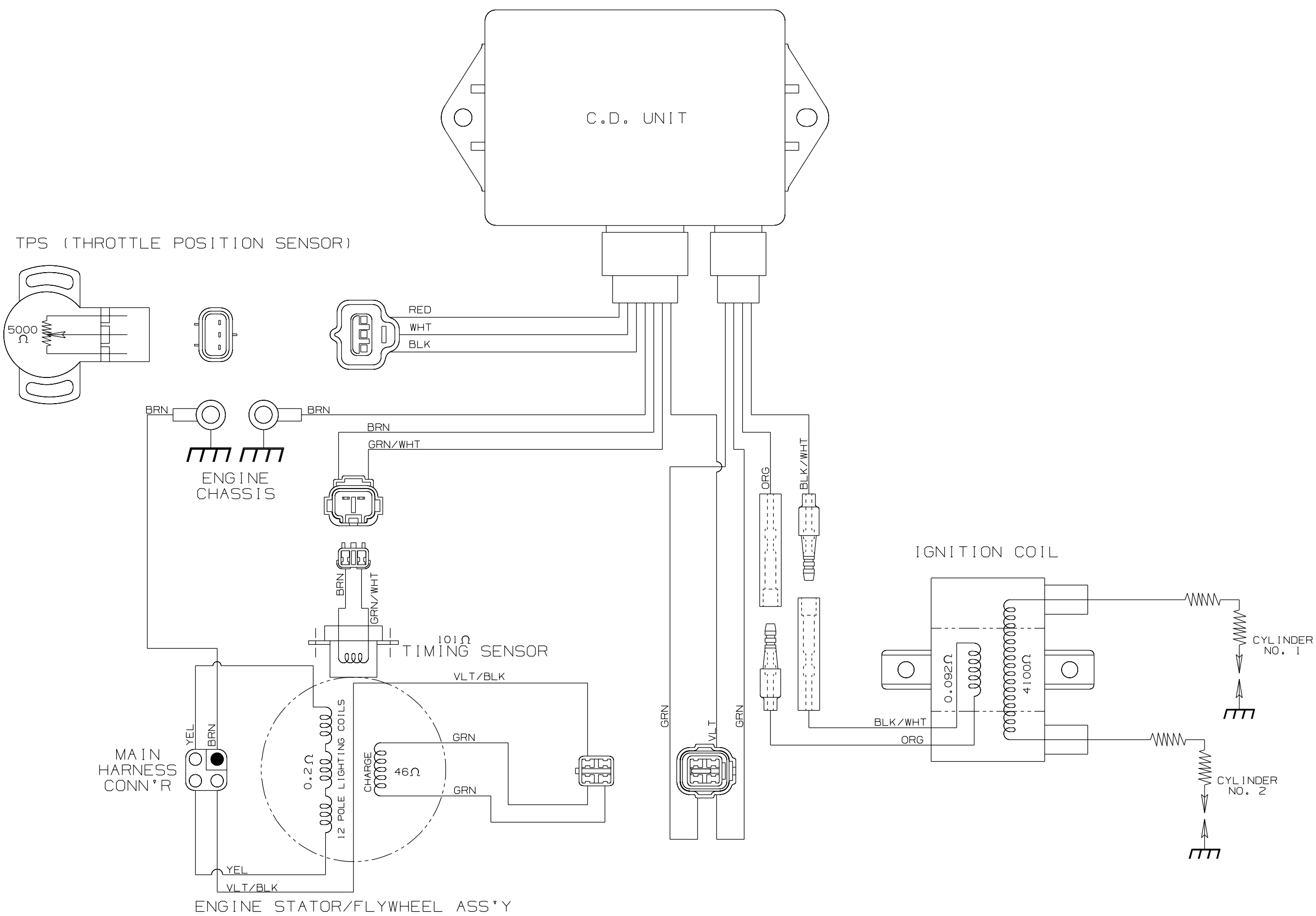
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Harness H



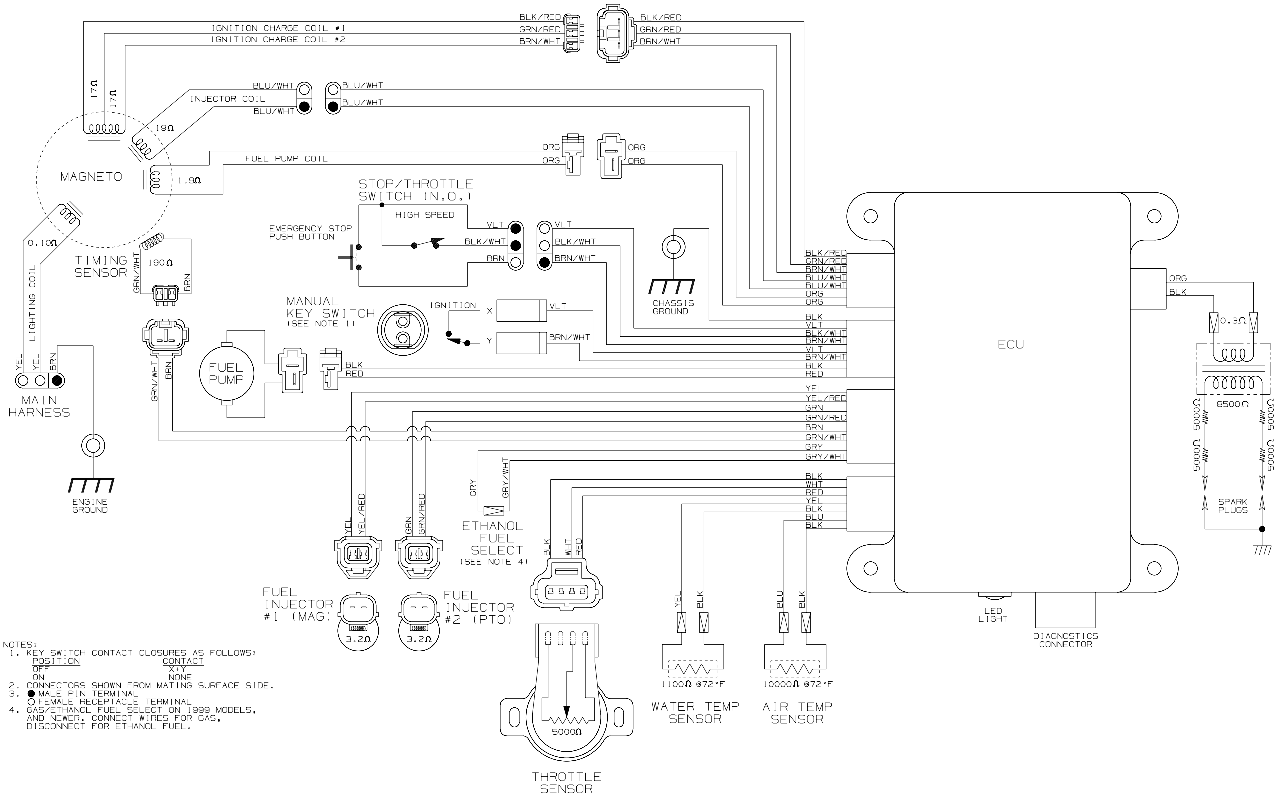
686-667A

Harness I



686-668A

Harness J



NOTES:
1. KEY SWITCH CONTACT CLOSURES AS FOLLOWS:

POSITION	CONTACT
OFF	X+Y
ON	NONE

2. CONNECTORS SHOWN FROM MATING SURFACE SIDE.
3. ● MALE PIN TERMINAL
   ○ FEMALE RECEPTACLE TERMINAL
4. GAS/ETHANOL FUEL SELECT ON 1999 MODELS, AND NEWER. CONNECT WIRES FOR GAS, DISCONNECT FOR ETHANOL FUEL.

5

0686-672

SECTION 6 — CHASSIS ELECTRICAL SYSTEMS

6

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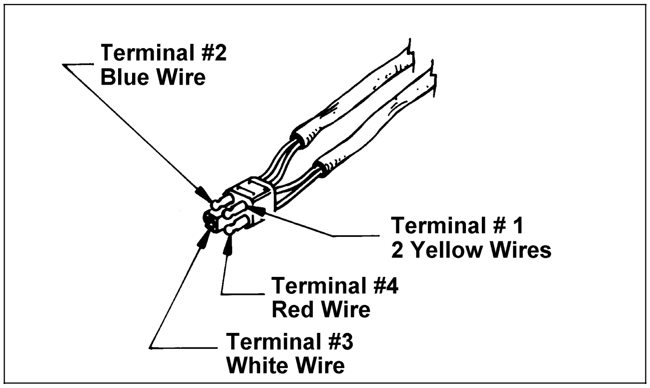
Brakelight Switch
(Hydraulic System)

TESTING/REMOVING

1. Disconnect the wiring harness from the brake control.

2. To test the brakelight switch, connect one tester lead to the #1 terminal; then connect the other lead to the #4 terminal.

Fig. 6-1



727-650A

3. With the brake lever compressed, the meter must read resistance. With the brake lever released, the meter must read no resistance. If the meter does not read as specified, the brakelight switch is defective and must be replaced.

4. To remove the switch, use a small screwdriver to compress the plastic locking tabs by pushing in on the tabs; then slide the switch free of the brake control.

Fig. 6-2



AF201D

INSTALLING

1. Slide the brakelight switch into the brake control assembly until the self-locking tabs snap into position. Give the switch body a light pull to make sure the switch is properly secured.

2. Connect the switch harness to the main wiring harness. Position the wires so they will not be either pinched or come in contact with any moving components. Start the engine and check the switch for proper operation.

Brakelight Switch
(Mechanical System)

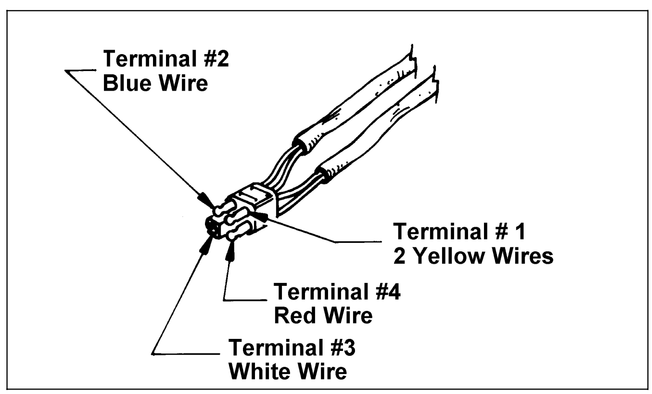
TESTING / REMOVING

1. Disconnect the wiring harness from the brake control.

Terminal	Corresponding Wire Color	Wire Usage
1	Yellow	Power Supply
2	Blue	Headlight - High Beam
3	White	Headlight - Low Beam
4	Red	Brakelight

2. Connect one tester lead to the #1 terminal; then connect the other lead to the #4 terminal.

Fig. 6-3



727-650A

3. With the brake lever compressed, the meter must read less than 1 ohm of resistance. With the brake lever released, the meter must read no resistance. If the meter does not read as specified, the brakelight switch is defective and must be replaced.

4. Use a small screwdriver to compress the plastic locking tabs by pushing in on the tabs; then slide the switch free of the brake control.

Fig. 6-4



AF907D

INSTALLING

1. Slide the brakelight switch into the brake control assembly until the self-locking tabs snap into position. Give the switch body a light pull to make sure the switch is properly secured.

2. Connect the switch harness to the main wiring harness. Position the wires so they will not be either pinched or come in contact with any moving components. Start the engine and check the switch for proper operation.

Headlight Dimmer Switch

TESTING

1. Disconnect the headlight dimmer switch plug (located next to the air-intake silencer).

2. Use the tester connections indicated in the following chart. If the meter does not read as specified, the headlight dimmer switch is defective and must be replaced.

Position	Lead to Terminal (Wire Color)	Lead to Terminal (Wire Color)	Meter Reading
High Beam	1 (Yellow)	2 (Blue)	Less than 1 ohm
High Beam	1 (Yellow)	3 (White)	OL
Low Beam	1 (Yellow)	2 (Blue)	OL
Low Beam	1 (Yellow)	3 (White)	Less than 1 ohm

REMOVING

1. Remove the handlebar pad.

2. Remove the screws from the cover plate securing the dimmer switch.

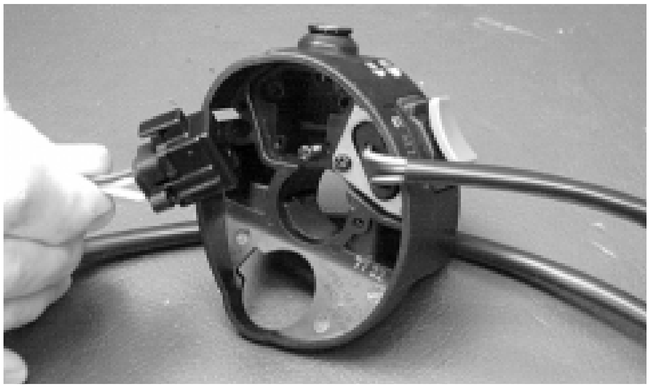
Fig. 6-5



AF908D

3. Remove the plate and lift the switch free of the control.

Fig. 6-6



AF909D

INSTALLING

1. Place the dimmer switch into the control and secure with the cover plate and screws.

2. Connect the four-prong plug; then install and secure the handlebar pad.

Testing Handlebar Warmer Elements

1. Remove the handlebar pad; then disconnect the handlebar warmer three-wire connector.
2. In the element connector, connect the ohmmeter between the green/white and yellow lead wires.
3. The meter must read between 7.4 and 9 ohms.
4. In the element connector, connect the ohmmeter leads between the green/black and yellow lead wires.
5. The meter must read between 12.5 and 15.5 ohms.
6. Replace any element measuring less than or more than the specified amount.
7. Connect the leads; then install and secure the handlebar pad.

Testing Thumb Warmer Element

1. Remove the handlebar pad; then disconnect the thumb warmer three-wire connector.
2. In the element connector, connect one ohmmeter lead to the green/white lead; then connect the other ohmmeter lead to the yellow lead.
3. The meter must read between 1.7 and 6.7 ohms.
4. In the element connector, connect one ohmmeter lead to the green/black lead; then connect the other ohmmeter lead to the yellow lead.
5. The meter must read between 7 and 17 ohms.

■ **NOTE: If either test is not within specifications, replace the thumb warmer element.**

6. Connect the leads; then install and secure the handlebar pad.

Testing Handlebar Warmer Switch (ON/OFF Function)

1. Remove the handlebar pad.
2. Disconnect the handlebar warmer two-wire connector.
3. In the switch connector, connect the ohmmeter leads to each terminal.
4. With the switch in the OFF position, the meter must read an open circuit. With the switch in the ON position, the meter must read 1 ohm or less resistance.
5. Connect the leads; then install and secure the handlebar pad.

Testing Handlebar Warmer Switch (HI/OFF/LO Function)

1. Remove the handlebar pad.
2. Disconnect the handlebar warmer three-wire connector.
3. In the switch connector, connect the ohmmeter leads to the green/white and yellow lead wires.
4. With the switch in the OFF (middle) position, the meter must read an open circuit. With the switch in the HI position, the meter must read 1 ohm or less resistance.
5. In the switch connector, connect the ohmmeter leads to the green/black and yellow leads.
6. With the switch in the OFF (middle) position, the meter must read an open circuit. With the switch in the LO position, the meter must read 1 ohm or less resistance.
7. Connect the leads; then install and secure the handlebar pad.

Testing Thumb Warmer Switch
(OFF/ON Function)

1. Remove the handlebar pad.
2. Disconnect the thumb warmer two-wire connector.
3. In the switch connector, connect the ohmmeter leads to each terminal.
4. With the switch in the OFF position, the meter must read an open circuit. With the switch in the ON position, the meter must read 1 ohm or less resistance.
5. Connect the leads; then install and secure the handlebar pad.

Testing Thumb Warmer Switch
(HI/OFF/LO Function)

1. Remove the handlebar pad.
2. Disconnect the thumb warmer three-wire connector.
3. In the switch connector, connect one ohmmeter lead to the green/white lead; then connect the other ohmmeter lead to the yellow lead.
4. With the switch in the OFF (middle) position, the meter must read an open circuit. With the switch in the HI position, the meter must read 1 ohm or less resistance.
5. In the switch connector, connect one ohmmeter lead to the green/black lead; then connect the other ohmmeter lead to the yellow lead.
6. With the switch in the OFF (middle) position, the meter must read an open circuit. With the switch in the LO position, the meter must read 1 ohm or less.
7. Connect the leads; then install and secure the handlebar pad.

Testing Passenger Handwarmer Switch

1. Disconnect the lead wires from the switch.
2. Connect the ohmmeter leads to each of the lead wires.
3. With the switch in one position, the meter must read OL (infinite resistance).
4. When the switch is moved to the other position, the meter must read less than 1 ohm of resistance.

Testing Passenger Handwarmer Elements

■ **NOTE: During this test, resistance will vary due to temperature; therefore, this test should be made at room temperature of 20° C (68° F).**

1. Disconnect the lead wires from the main wiring harness.
2. Connect one ohmmeter lead to the green/white wire from the element; then connect the other ohmmeter lead to the yellow wire from the element.
3. The meter must read between 9.8-13.8 ohms.

Wire Color Code and Function Description

■ **NOTE: The following wire color code and function description will assist in using the Main Harness and Hood Harness wiring diagrams in this section. Note that some colors are numbered. When a numbered color appears on either of the wiring diagrams, refer to this color code description page, and it will provide you with additional information.**

COLOR	FUNCTION — DESCRIPTION
Brown	**Electrical Common; Chassis Ground**
	The brown wire is connected to the chassis at the engine stator plate and also through the voltage regulator chassis bolt (prior to 1989, the taillight harness also had a chassis connection). The headlight bracket is grounded on some models to reduce the bracket RFI emissions. All brown wires are common ground.
Yellow	**AC Power; 13 Volts AC (Alternating Current)**
	The yellow wire is connected to the engine stator plate lighting coil and the voltage regulator. The voltage produced by the lighting coil is very engine RPM dependent. The voltage regulator is necessary to maintain 13.5 VAC on the yellow wire whenever the engine exceeds about 3000 RPM. All yellow wires are 13 VAC. The signal on the yellow wire is AC. Not only is the voltage level of this signal RPM dependent, but the signal frequency (cycles per second) is RPM dependent as well. The electric tachometer uses this changing frequency phenomenon to indicate the engine RPM. An electric tachometer will operate properly when connected to any yellow (13 VAC) and brown (common ground) wire pair.
White	**Headlight Low Beam**
	The white wire connects the dimmer switch to the headlight bulb. The low beam filament will illuminate when the dimmer switch connects the white wire to 13 VAC power.
Blue	**Headlight High Beam and Indicator Light**
	The blue wire connects the dimmer switch to the headlight bulb. The high beam will illuminate when the dimmer switch connects the blue wire to 13 VAC power. Some models use a tachometer with a high beam indicator light. The high beam indicator light will also illuminate when the dimmer switch connects the blue wire to 13 VAC power.
Green	**Handlebar Warmer Indicator Light**
	Some models use a tachometer with a handlebar warmer indicator light. The green wire connects the handlebar warmer switch to the “warmer” indicator light. The “warmer” light will illuminate when the handlebar warmer switch connects the green wire to common ground.

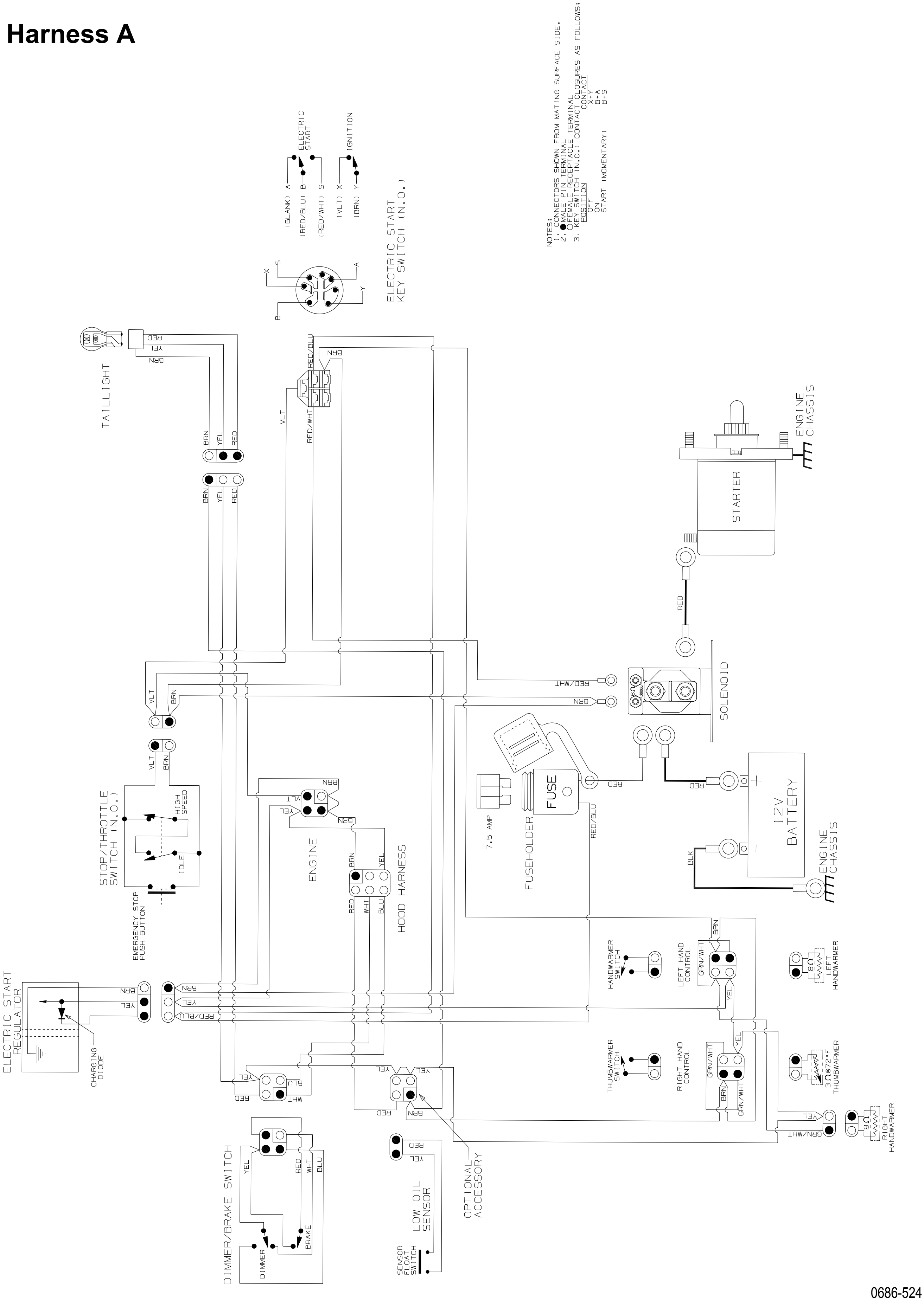
COLOR	FUNCTION — DESCRIPTION
Violet or Black (NOI)	**Ignition System “Shut-Off”**
	The violet or black wire connects the ignition system CDI module to the throttle control switches. Ignition spark is interrupted when any of the switches close, connecting the violet or black wire to a common ground.
Black/Red	**Ignition System “Shut-Off”**
	The black/red wire connects the throttle control switches to the ignition switch. “Spark” occurs when the black/red is at a common ground level and “spark” stops when the black/red wire is open (not connected to common ground).
Red/White #1	**High Temperature Warning Light**
	Some models use a speedometer with a high temperature warning light. The red/white #1 wire connects the high temperature sensor to the temperature warning light. The “temp” light will illuminate when the sensor connects the red/white #1 wire to common ground.
Red/White #2	**Solenoid Coil Power**
	The red/white #2 wire connects the ignition switch (12 volt DC) power to the solenoid. The solenoid will activate when the ignition switch connects the red/white #2 wire to the + 12 VDC battery power.
Red #1	**Brakelight**
	The red #1 wire connects the brake control assembly switch to the brakelight filament. The brakelight will illuminate when the brake switch connects the red #1 wire to 13 VAC power.
Red #2	**Electric Start Battery Power; 12 Volts DC (Direct Current)**
	The red #2 wire connects the battery positive post (+12 VDC) to the ignition switch through the fuse holder. All electric start red #2 wires are +12 VDC. If the fuse “blows,” all red #2 wires are disconnected from the battery and battery charging (via the charging diode) discontinues until the fuse is replaced.
Red #3	**Low Oil Warning Light**
	The red #3 wire connects the low oil sensor to the “oil” warning light. The “oil” light will illuminate when the sensor connects the red #3 wire to 13 VAC power.
Gray	**Electric Fuel Level Gauge**
	Some models are equipped with an electric fuel level gauge. The gray wire connects the in-tank resistive sensor to the gauge. As the fuel level rises, the sensor resistance decreases, and the gauge needle rises; conversely, as the fuel level goes down, the sensor resistance increases, and the gauge needle drops.
Orange	**Reverse Alarm**
	Some models are equipped with a reverse gear and reverse alarm. The orange wire connects the reverse switch to the reverse alarm. The reverse alarm will “beep” when the switch connects the orange wire to 13 VAC power.

Wiring Diagrams

This chart is designed to direct the technician to the appropriate Main Harness Wiring Diagram and Hood Harness Wiring Diagram. Select the snowmoible from the chart to determine the correct diagram.

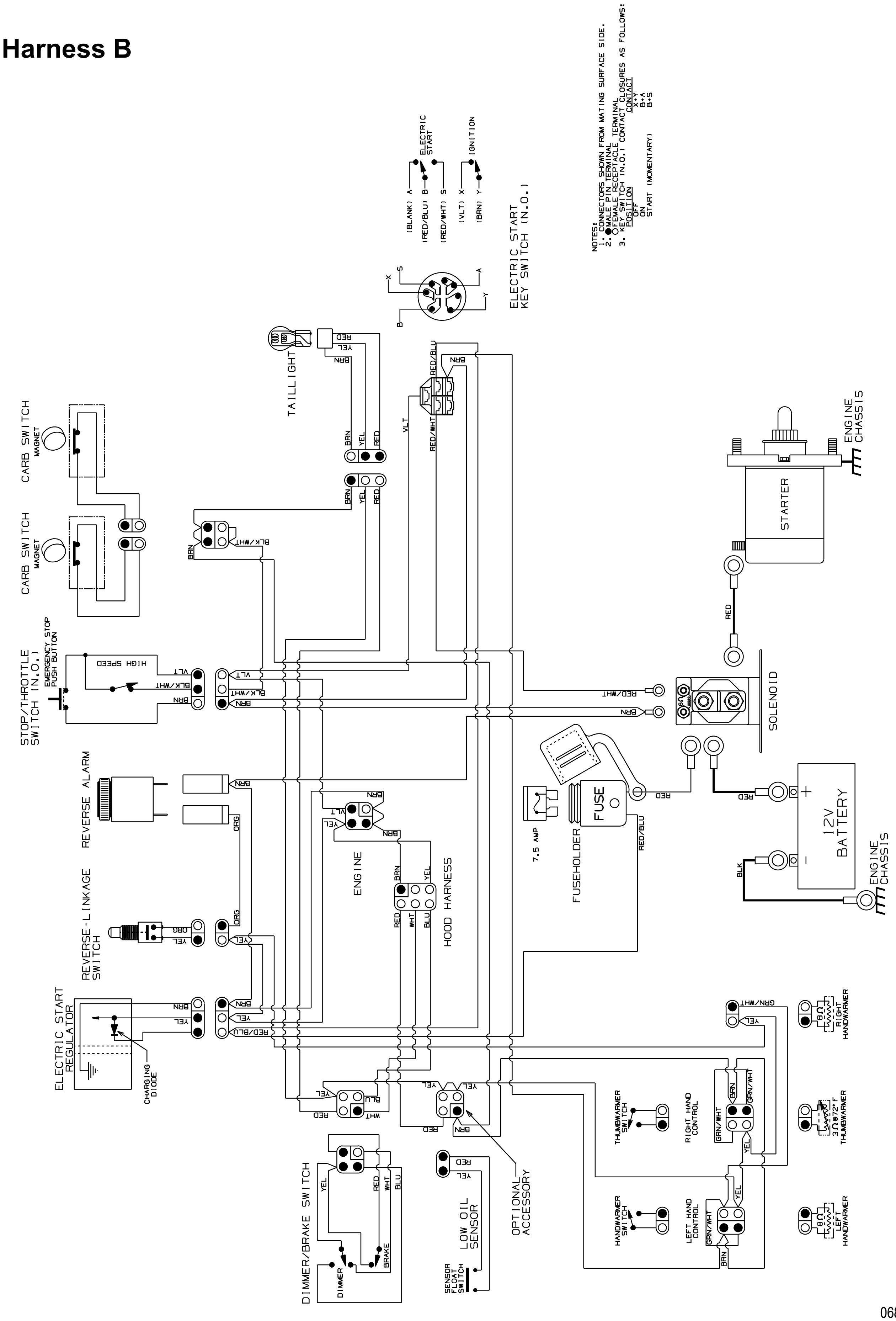
Snowmobile Models	Main Harness	Hood Harness	Snowmobile Models	Main Harness	Hood Harness
Bearcat 340	D	I	Z 370	L (es A)	IV
Bearcat 440 I	D	I	Z 440	M (es A)	IV
Bearcat 440 II	E	I	ZL 440	N	IV
Bearcat W/T	F	III	ZL 500	O	IV
Pantera 580 EFI	I	V	ZL 500 EFI	G	IV
Pantera 1000	J	V	ZL 550	P	IV
Panther 340	A	I	ZL 580 EFI	I	IV
Panther 440	B	I	ZL 600	H	IV
Panther 550	C	II	ZL 600 EFI	G	IV
Powder Special 500 EFI	G	IV	ZL 700	H	IV
Powder Special 500 EFI LE	G	IV	ZR 500	O	IV
Powder Special 600	H	IV	ZR 500 EFI	G	IV
Powder Special 600 LE	H	IV	ZR 600	H	IV
Powder Special 600 EFI	G	IV	ZR 600 EFI	G	IV
Powder Special 600 EFI LE	G	IV	ZR 600 EFI LE (Clicker)	G	IV
Powder Special 700	H	IV	ZR 600 EFI LE (Reverse)	Q	IV
Powder Special 700 LE	H	IV	ZR 700	H	IV
Thundercat	T	IV	ZR 700 LE (Clicker)	H	IV
Thundercat M/C	T	IV	ZR 700 LE (Reverse)	R	IV
Triple Touring 600	K	IV	ZRT 600	S	IV
			ZRT 800	T	IV

Harness A



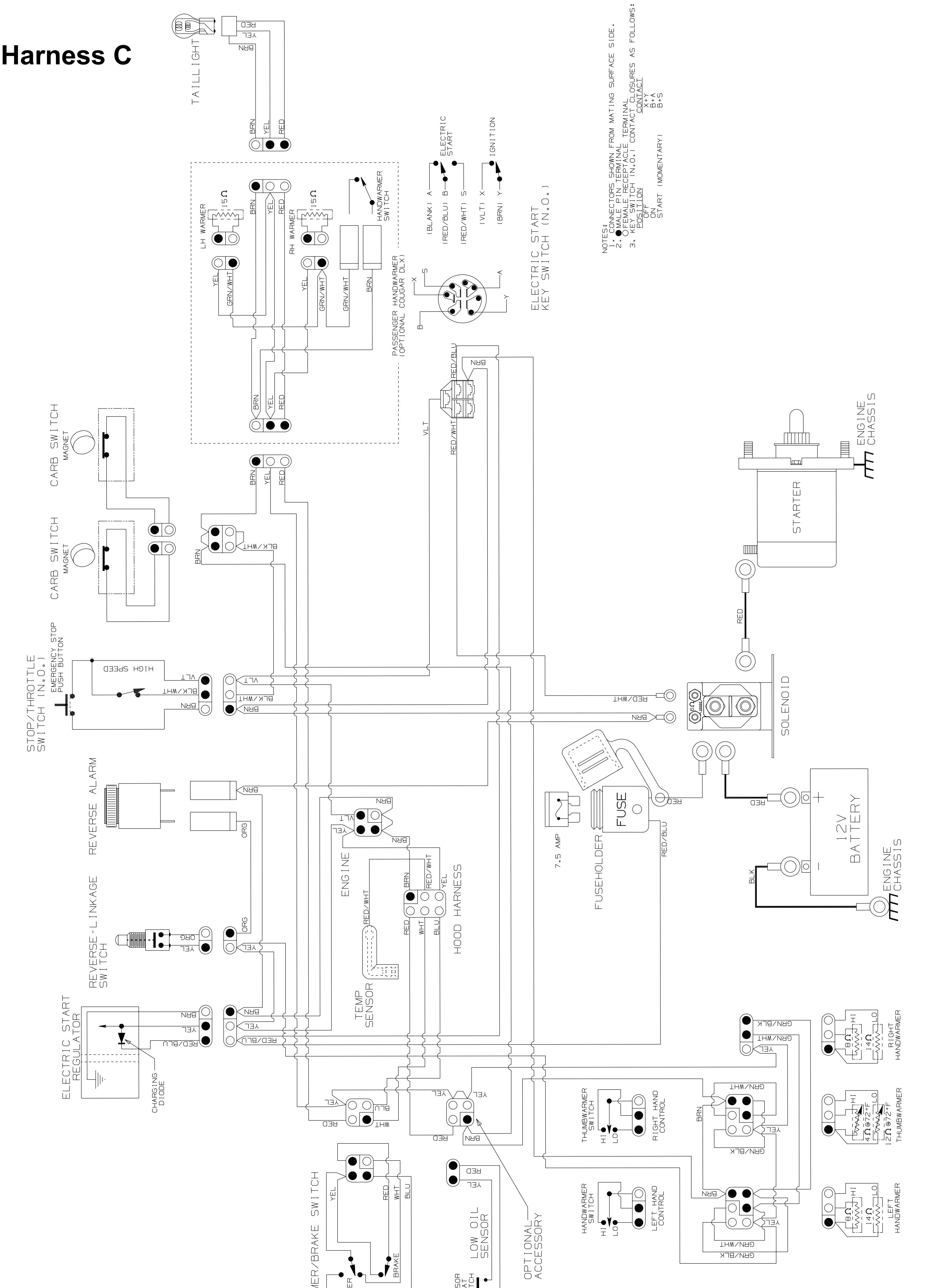
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Harness B



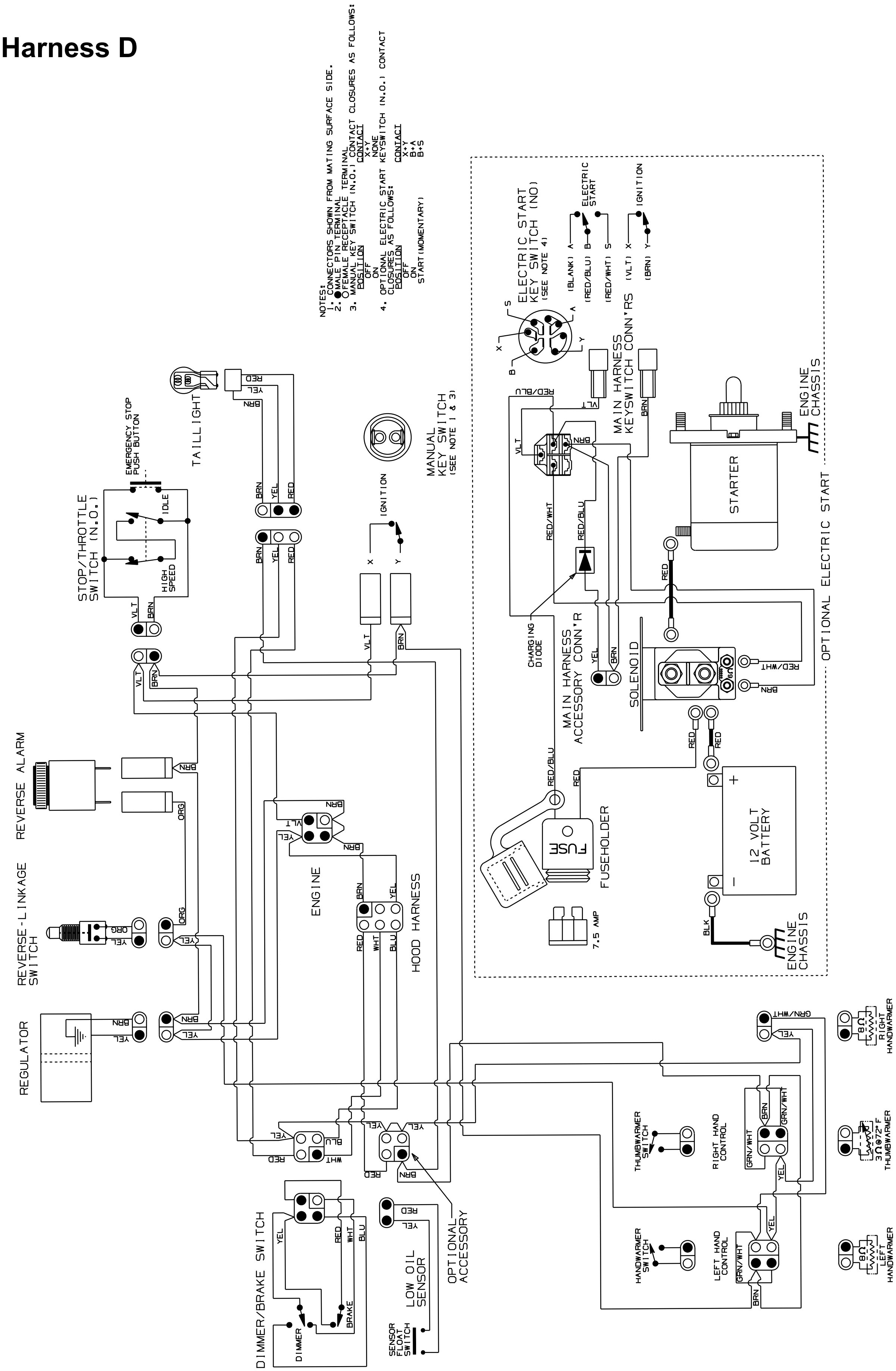
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Harness C

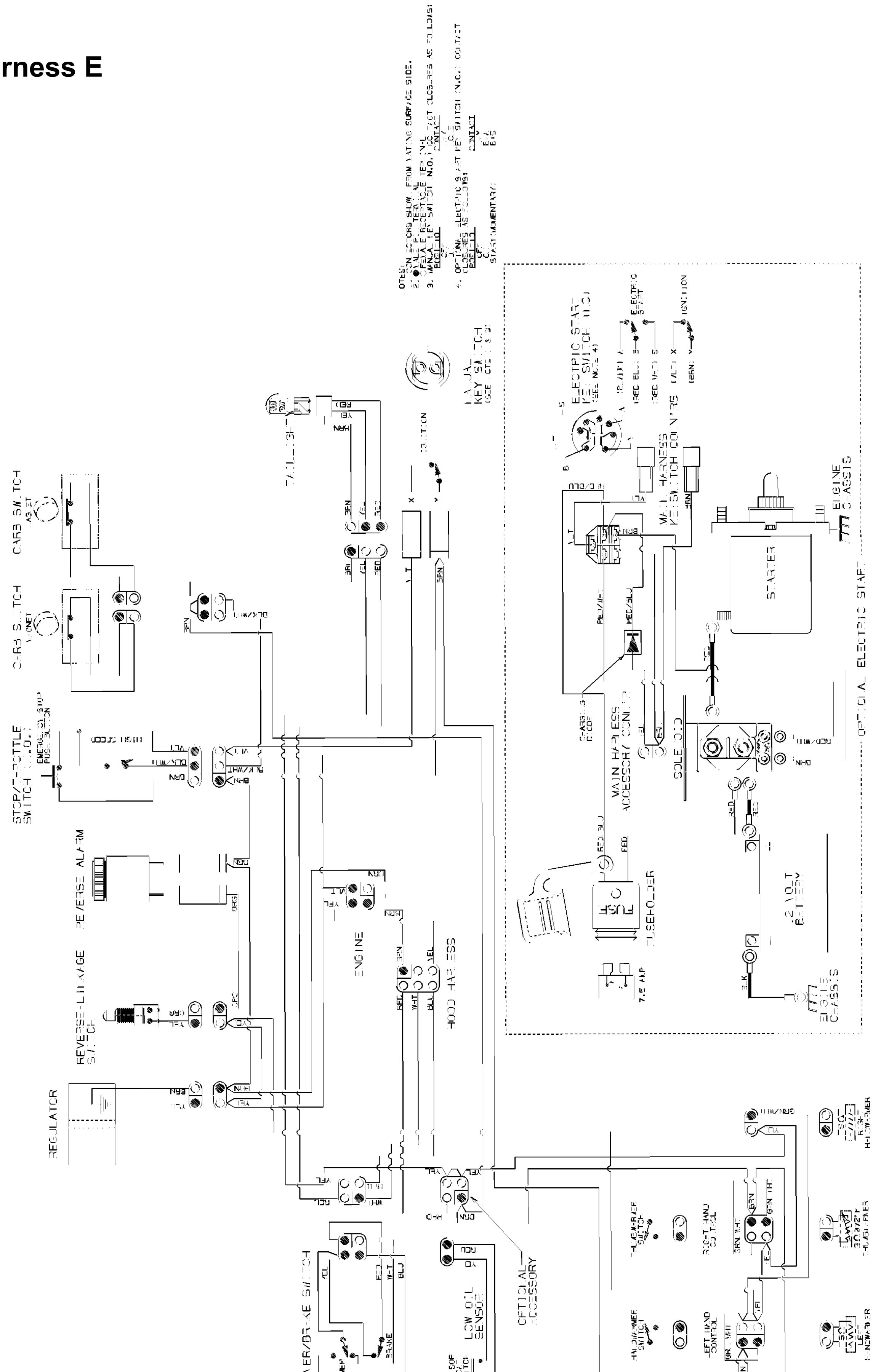


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Harness D

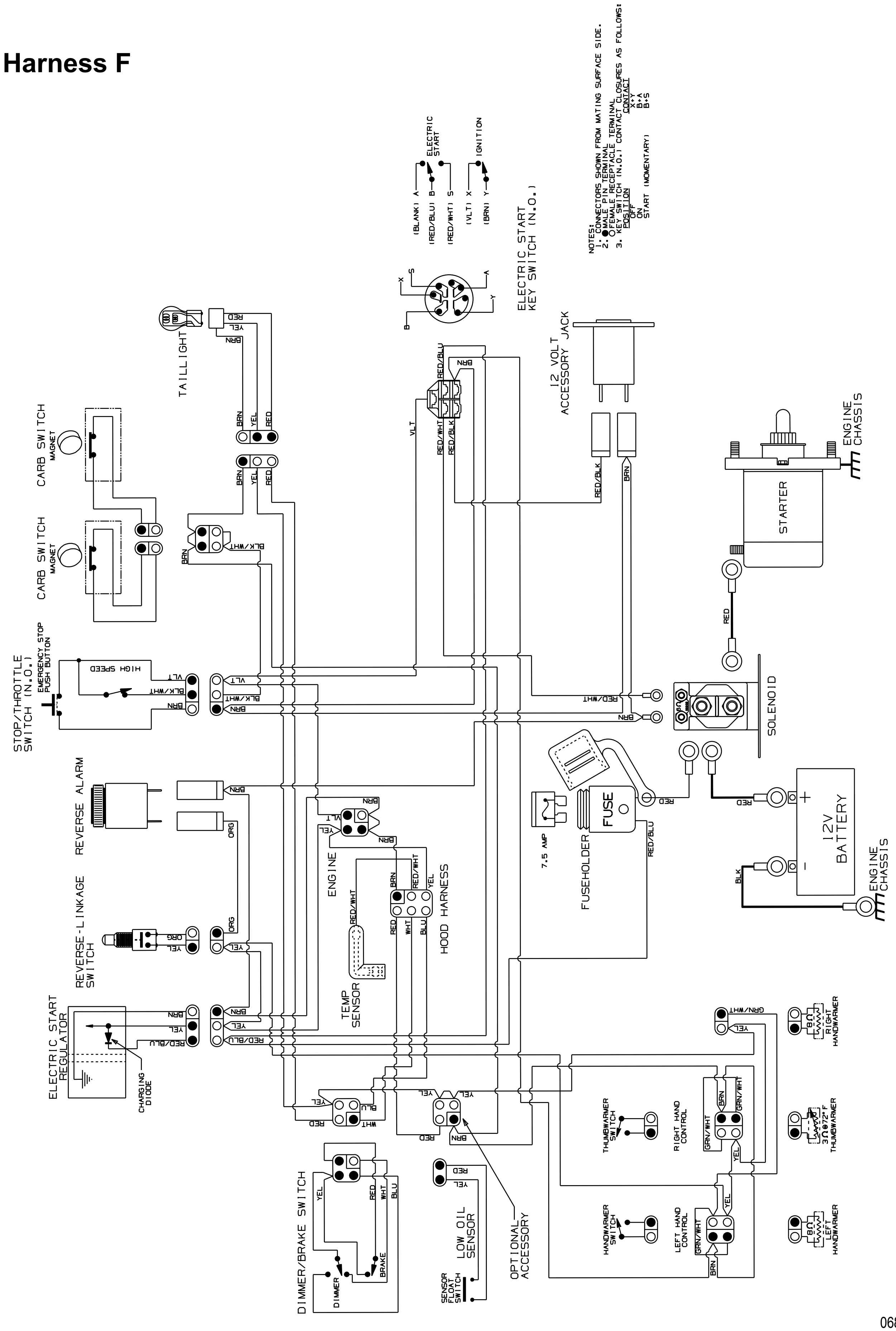

NOTES:
1. CONNECTORS SHOWN FROM MATING SURFACE SIDE.
2. ● MALE PIN TERMINAL
○ FEMALE RECEPTACLE TERMINAL
3. MANUAL KEY SWITCH (N.O.) CONTACT CLOSURES AS FOLLOWS:
POSITION CONTACT
OFF X+Y
ON NONE
4. OPTIONAL ELECTRIC START KEYSWITCH (N.O.) CONTACT CLOSURES AS FOLLOWS:
POSITION CONTACT
OFF X+Y
ON B+A
START(MOMENTARY) B+S
ELECTRIC START KEY SWITCH (NO)
(SEE NOTE 4)
ELECTRIC START
IGNITION
MAIN HARNESS KEYSWITCH CONN'RS
STARTER
ENGINE CHASSIS
OPTIONAL ELECTRIC START
SOLENOID
MAIN HARNESS ACCESSORY CONN'R
CHARGING DIODE
FUSE
FUSEHOLDER
7.5 AMP
12 VOLT BATTERY
TAILLIGHT
EMERGENCY STOP PUSH BUTTON
STOP/THROTTLE SWITCH (N.O.)
IDLE
HIGH SPEED
MANUAL KEY SWITCH
(SEE NOTE 1 & 3)
REVERSE ALARM
REVERSE-LINKAGE SWITCH
REGULATOR
ENGINE
HOOD HARNESS
DIMMER/BRAKE SWITCH
DIMMER
BRAKE
LOW OIL SENSOR
SENSOR FLOAT SWITCH
OPTIONAL ACCESSORY
THUMBWARMER SWITCH
RIGHT HAND CONTROL
HANDWARMER SWITCH
LEFT HAND CONTROL
RIGHT HANDWARMER
THUMBWARMER
LEFT HANDWARMER

Harness E



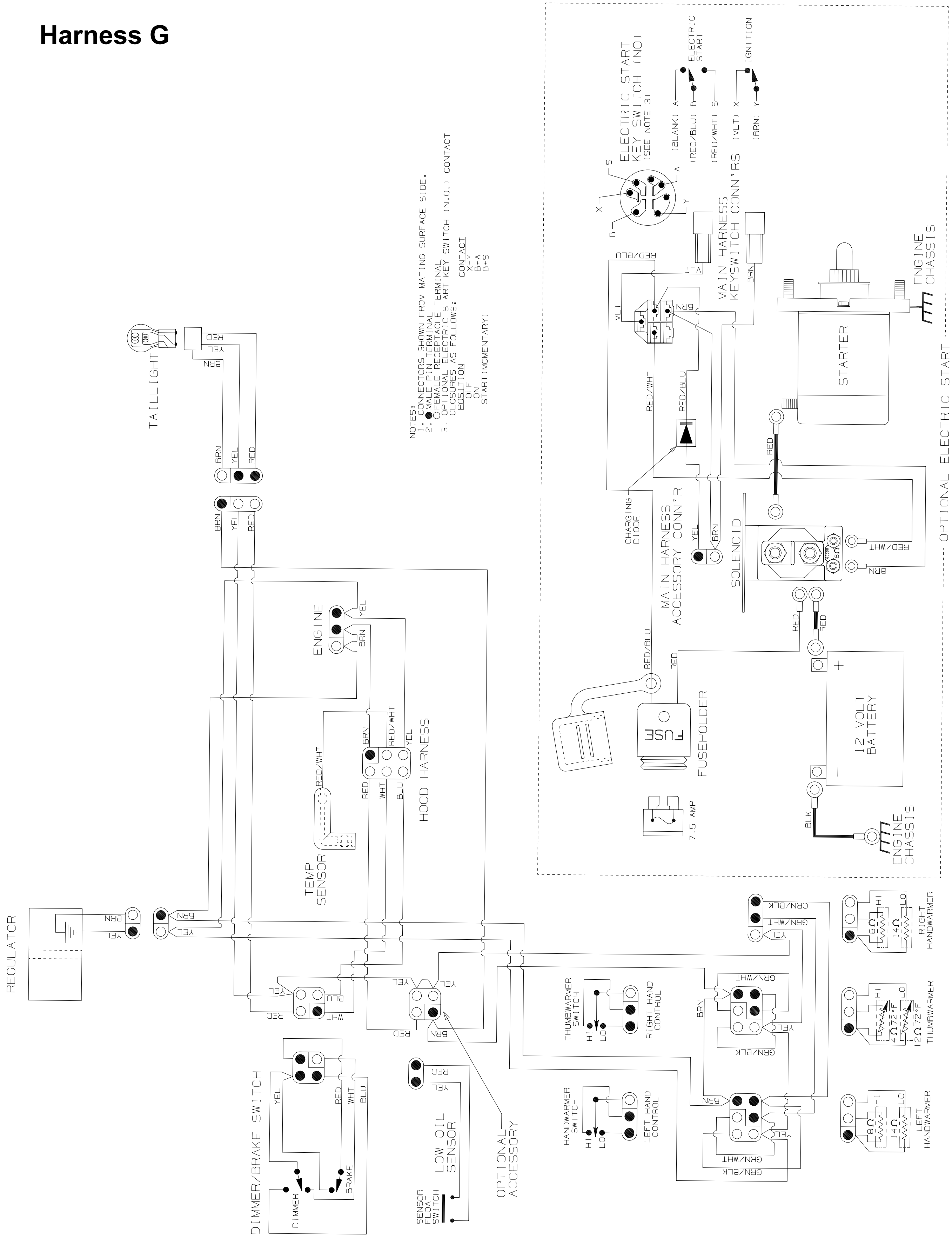
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Harness F



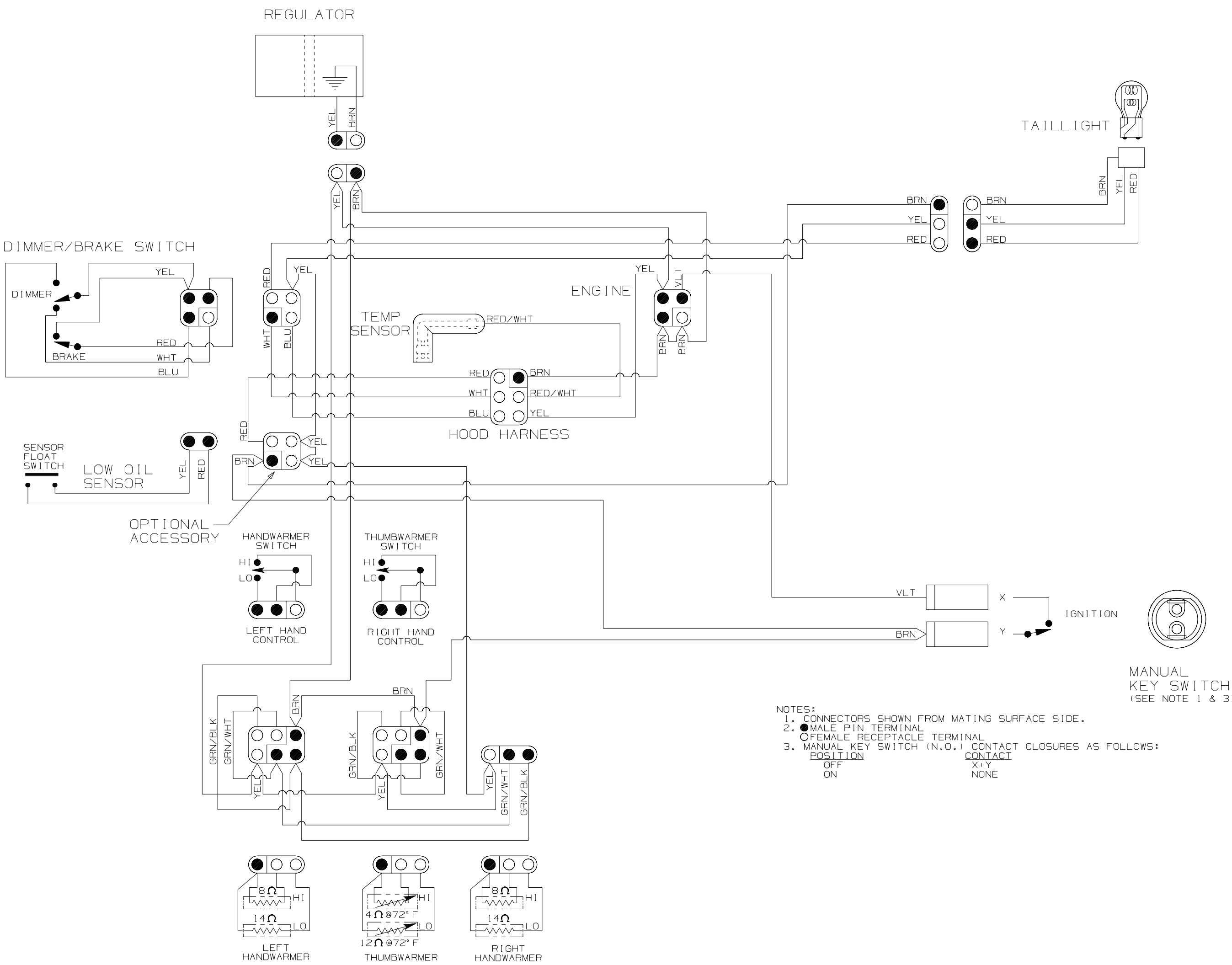
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Harness G



0686-530

Harness H

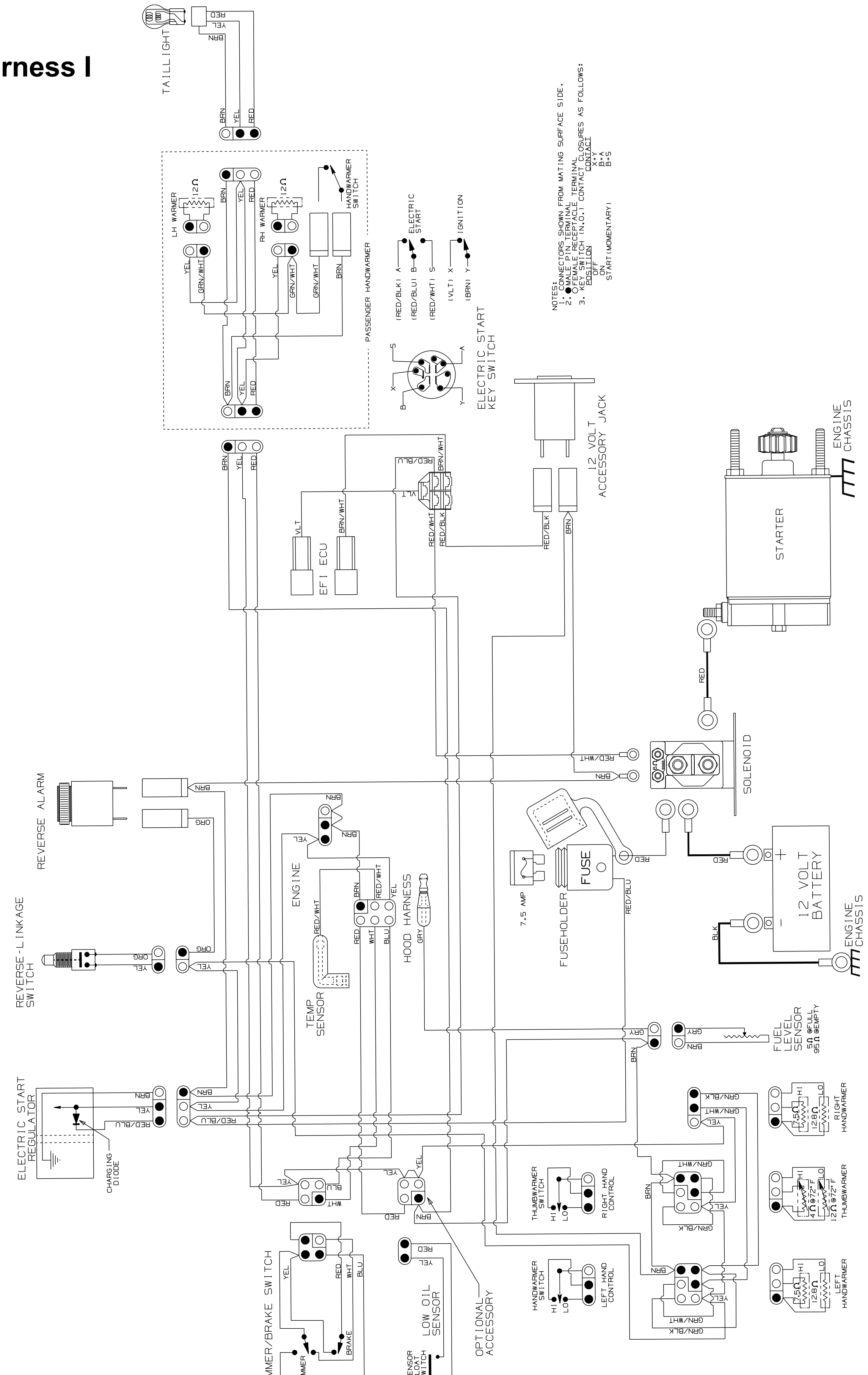


NOTES:
1. CONNECTORS SHOWN FROM MATING SURFACE SIDE.
2. ● MALE PIN TERMINAL
   ○ FEMALE RECEPTACLE TERMINAL
3. MANUAL KEY SWITCH (N.O.) CONTACT CLOSURES AS FOLLOWS:

POSITION	CONTACT
OFF	X+Y
ON	NONE

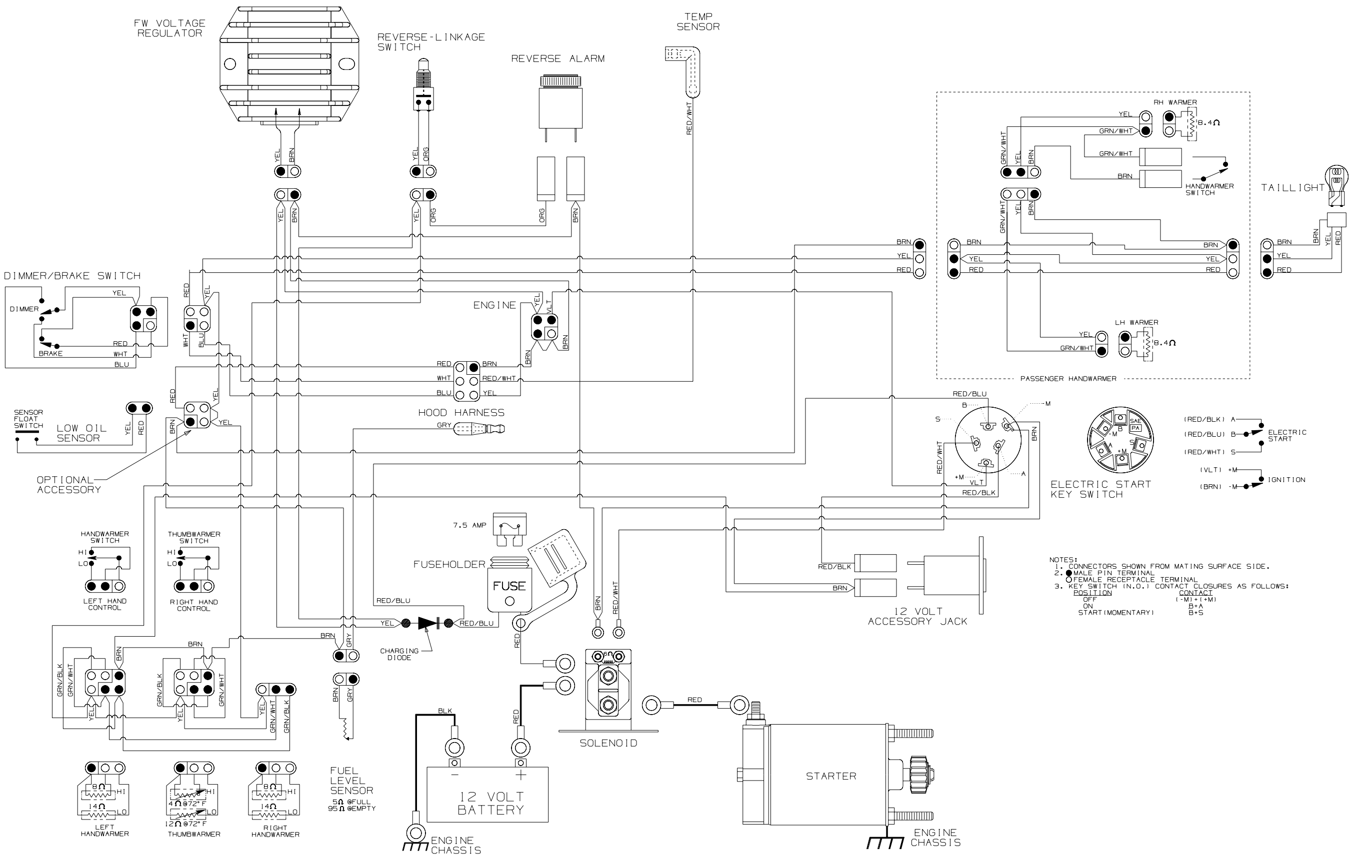
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Harness I



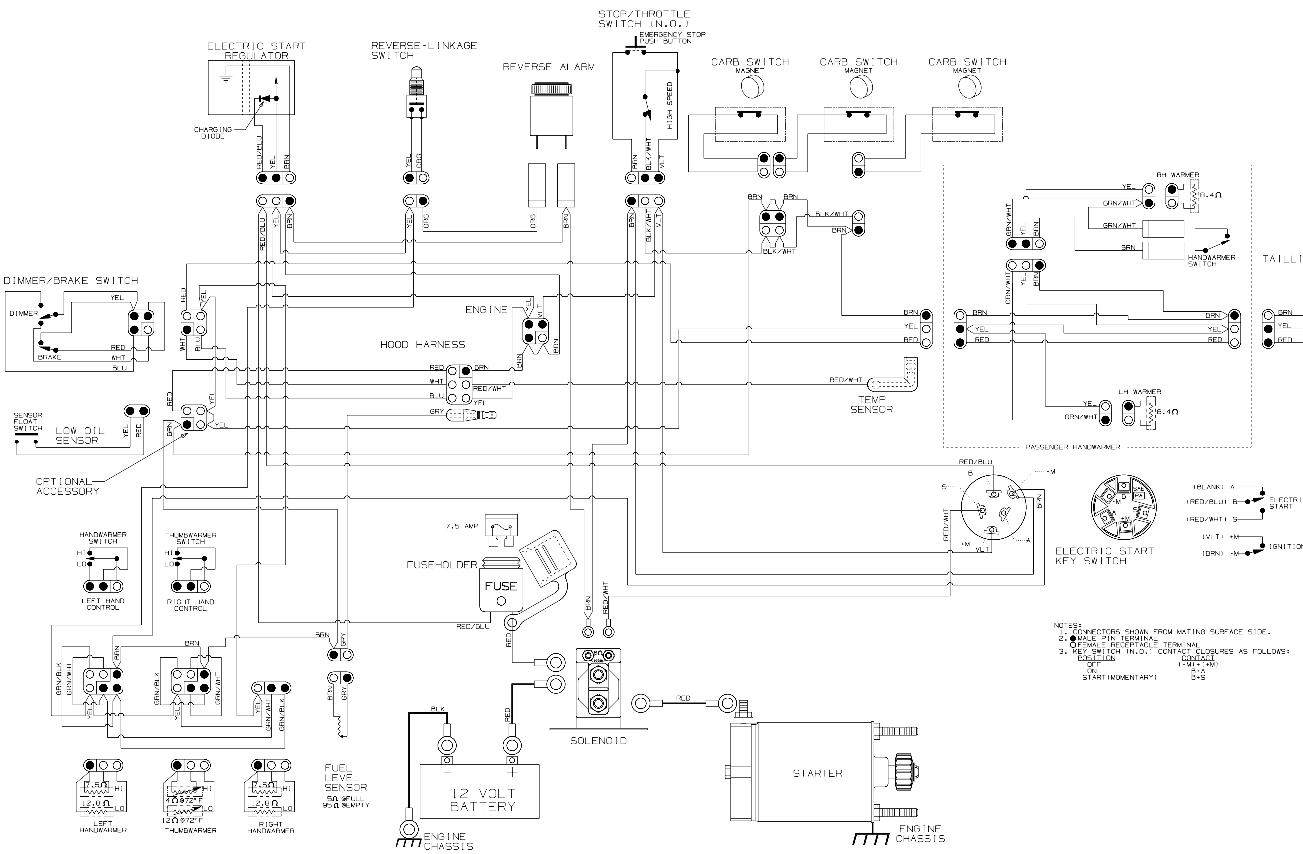
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Harness J



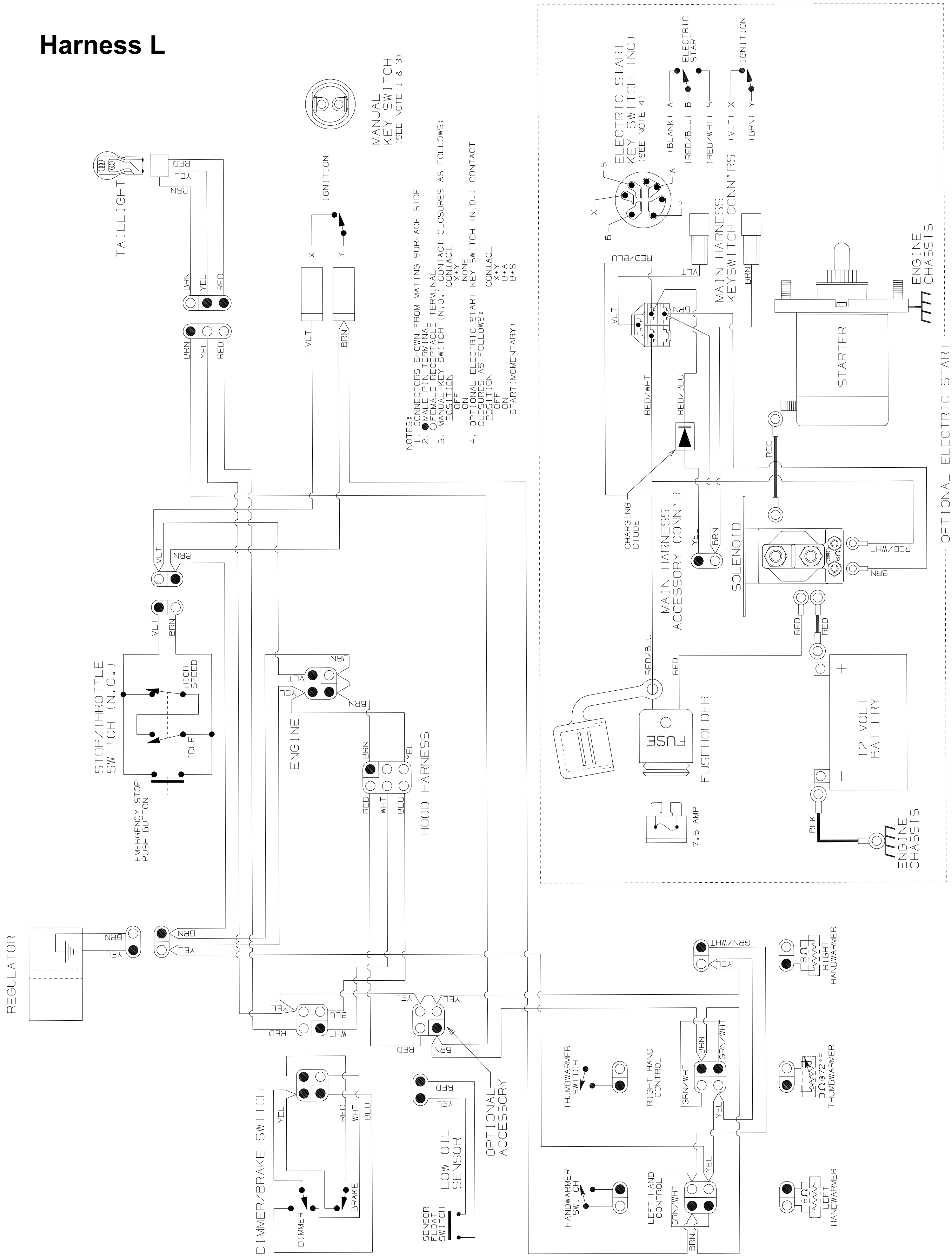
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Harness K



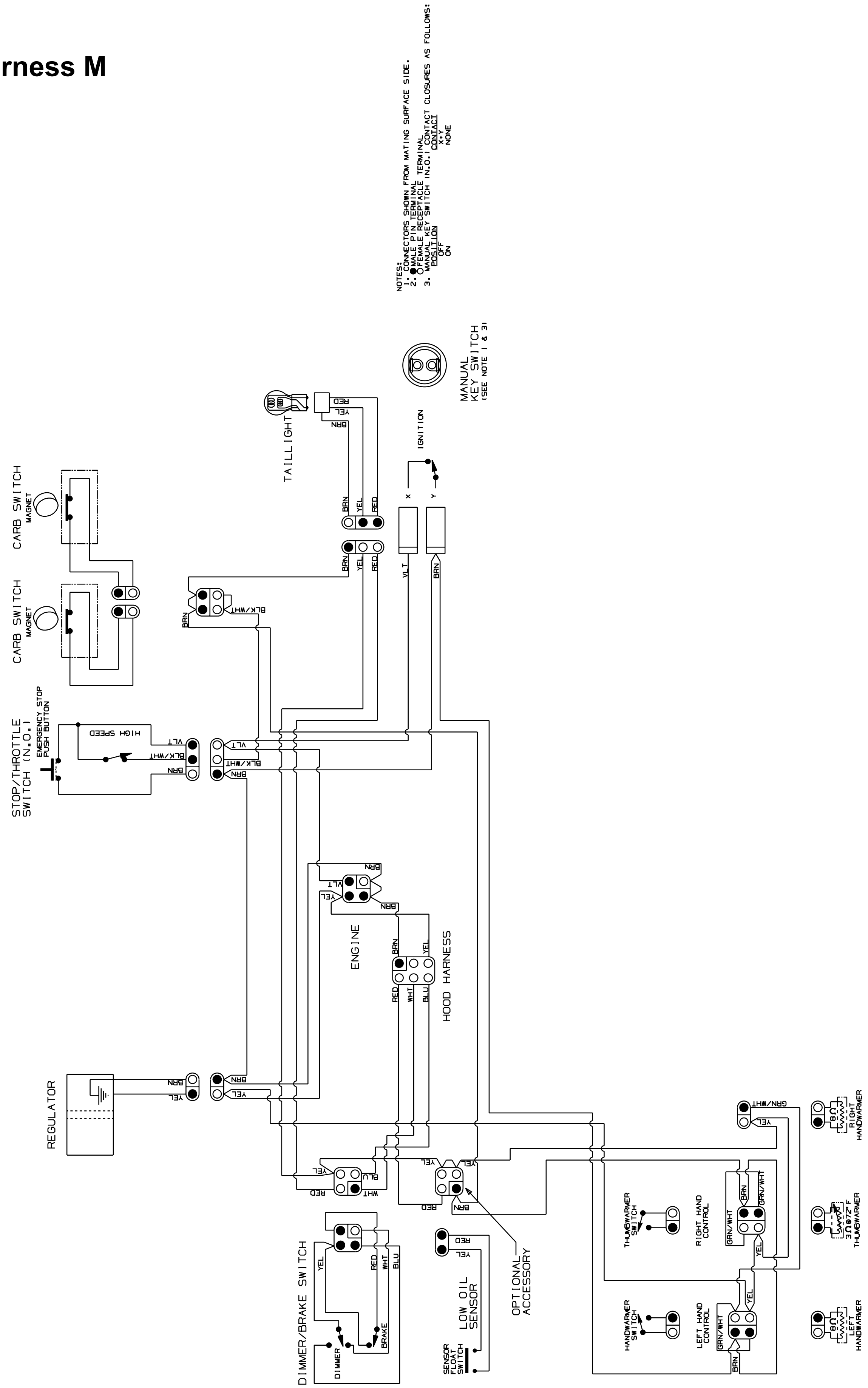
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Harness L



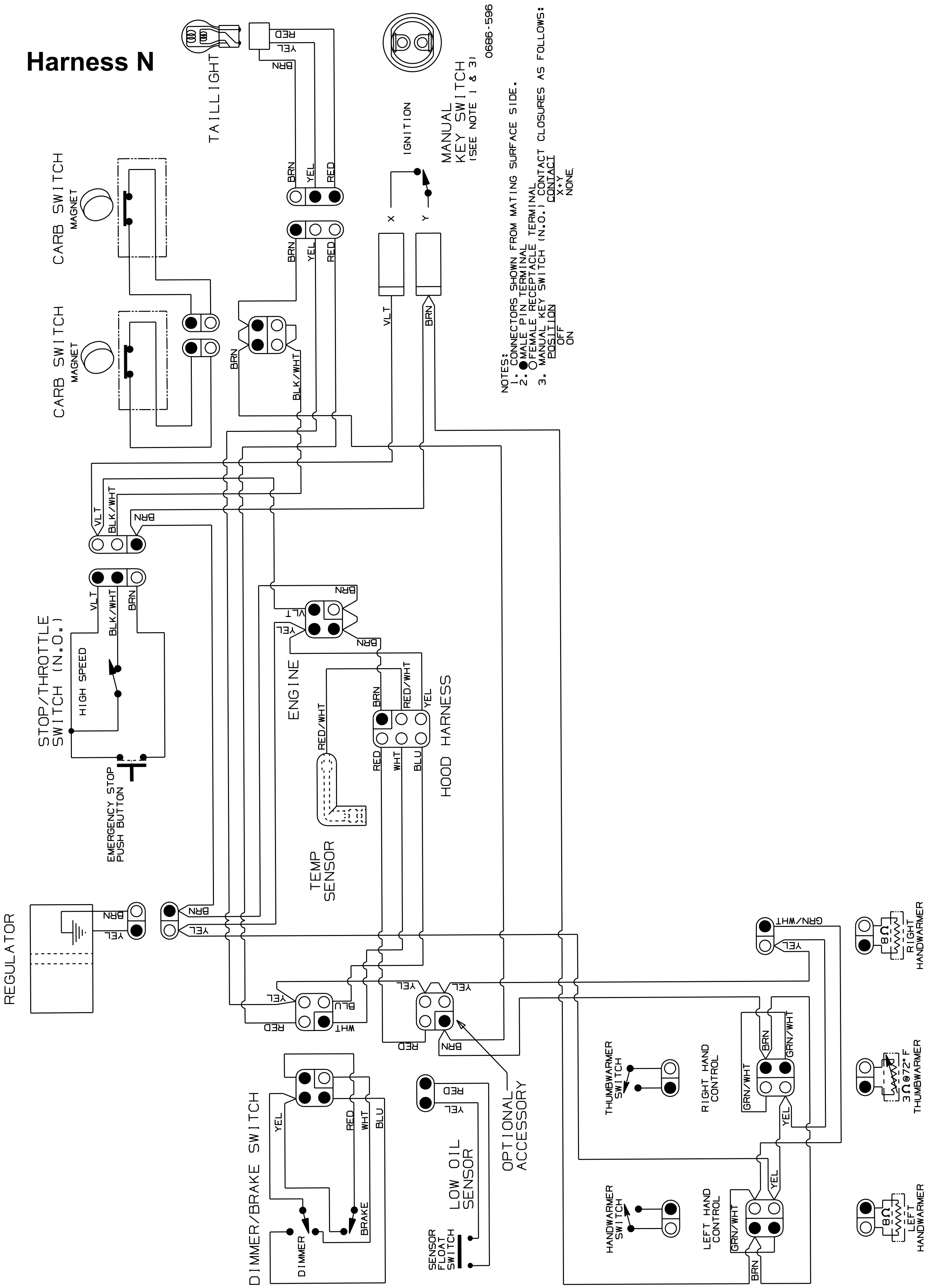
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Harness M



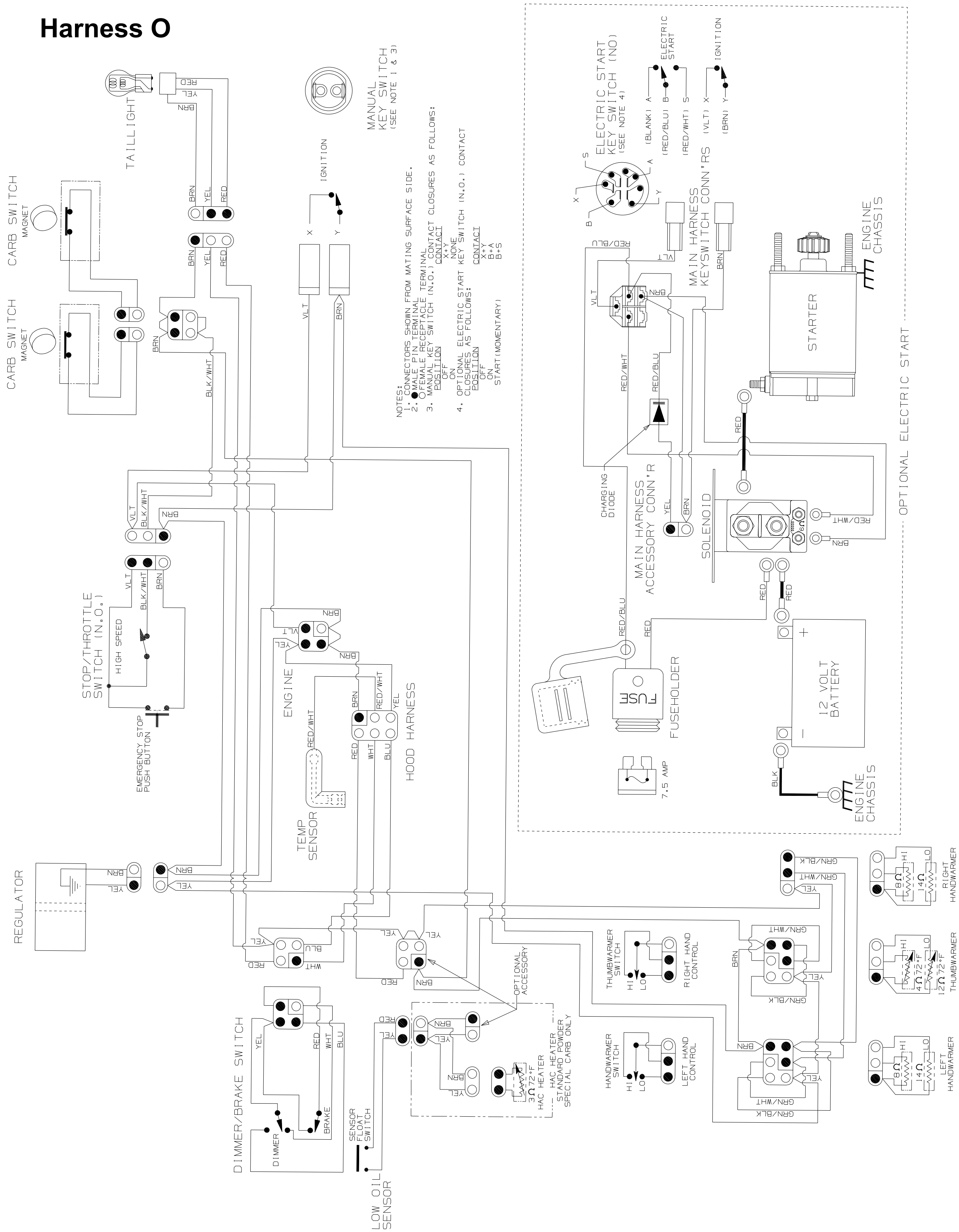
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Harness N



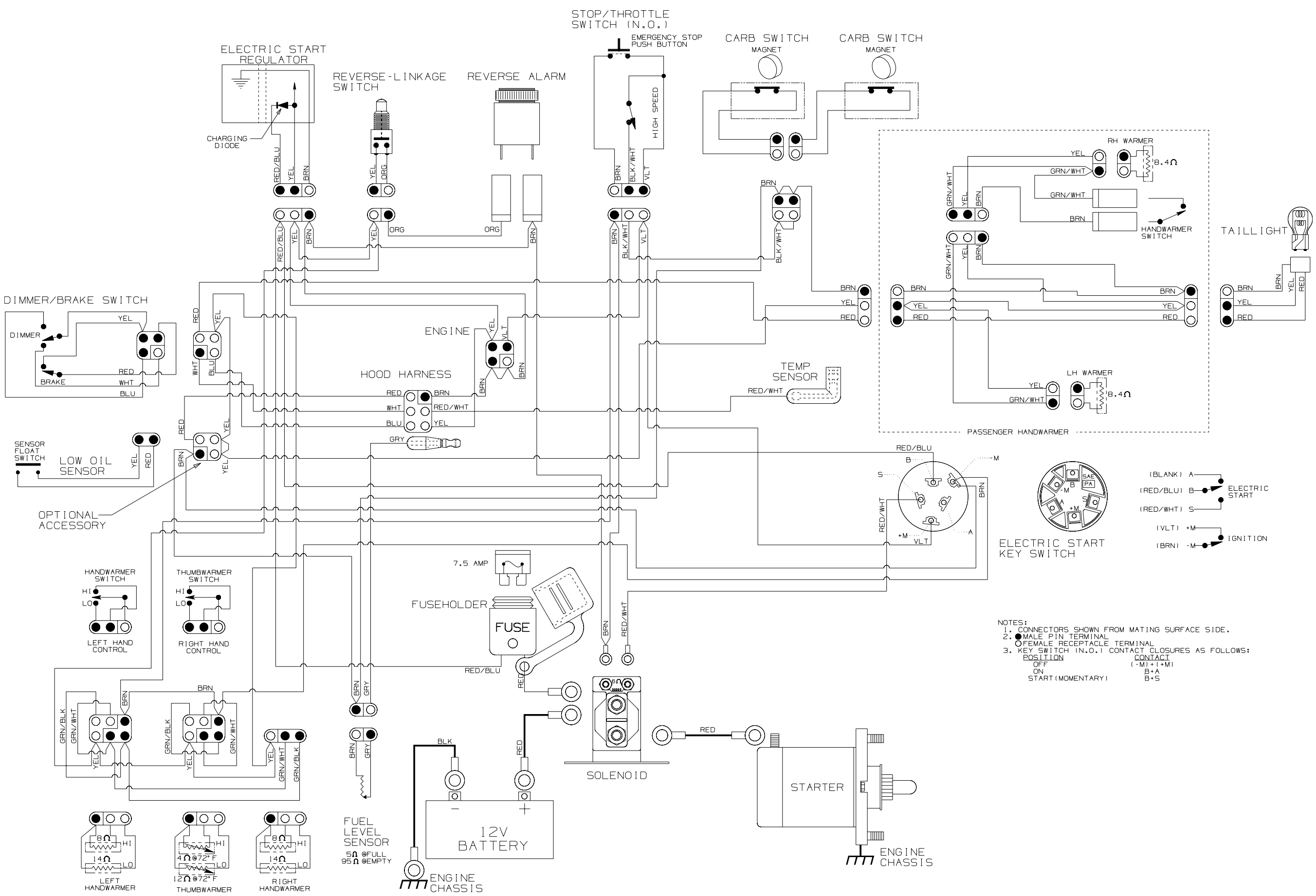
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Harness O



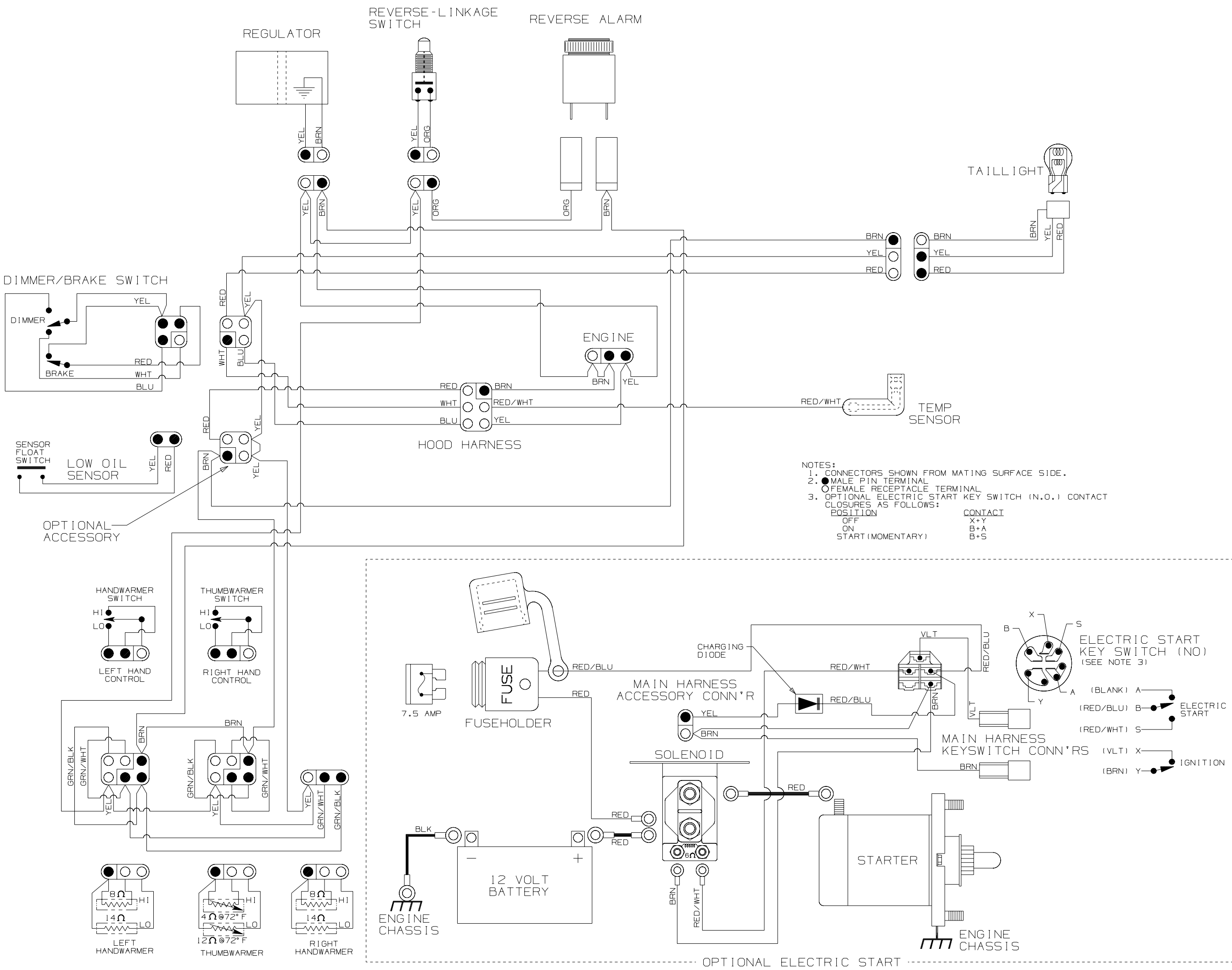
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Harness P



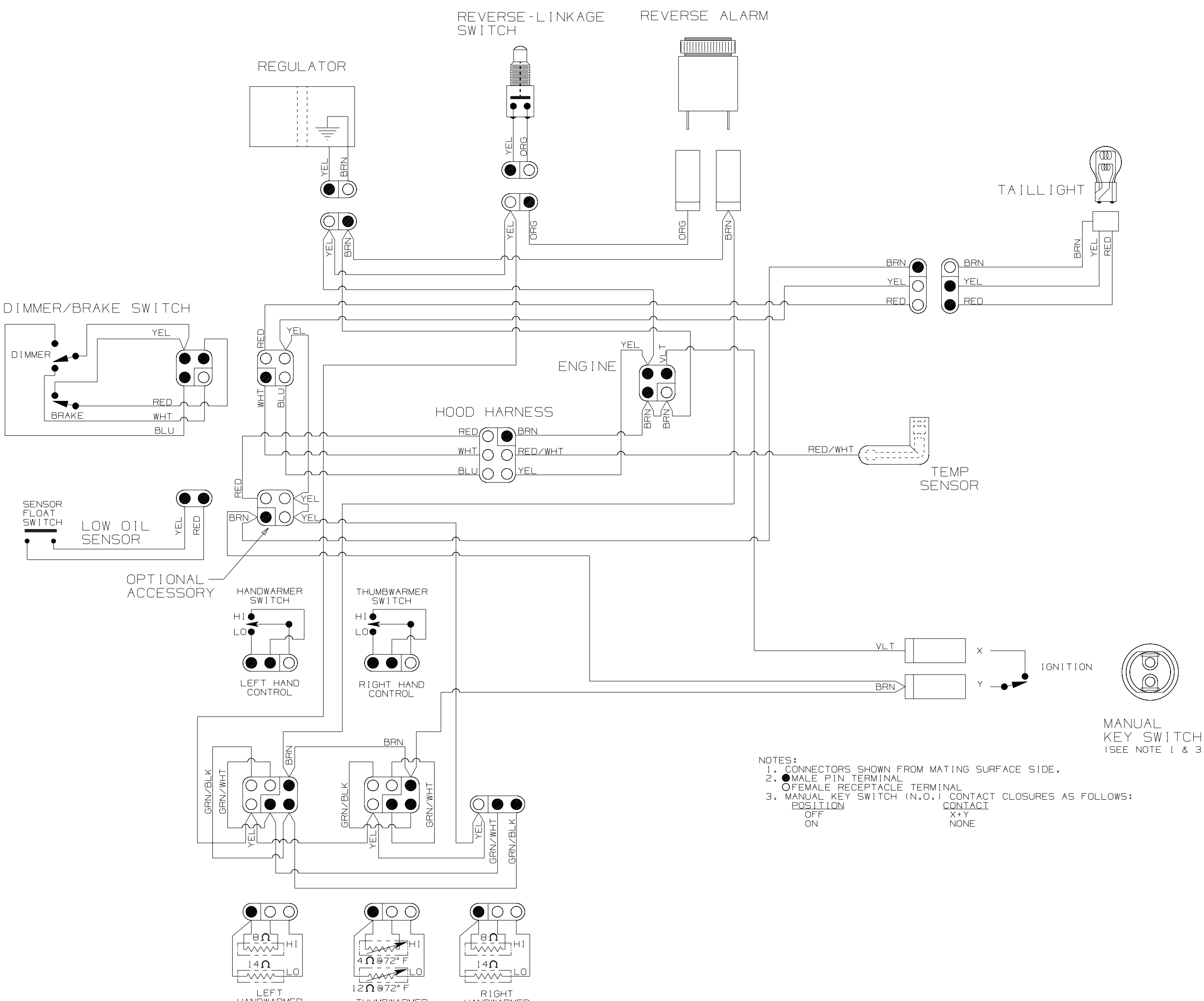
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Harness Q



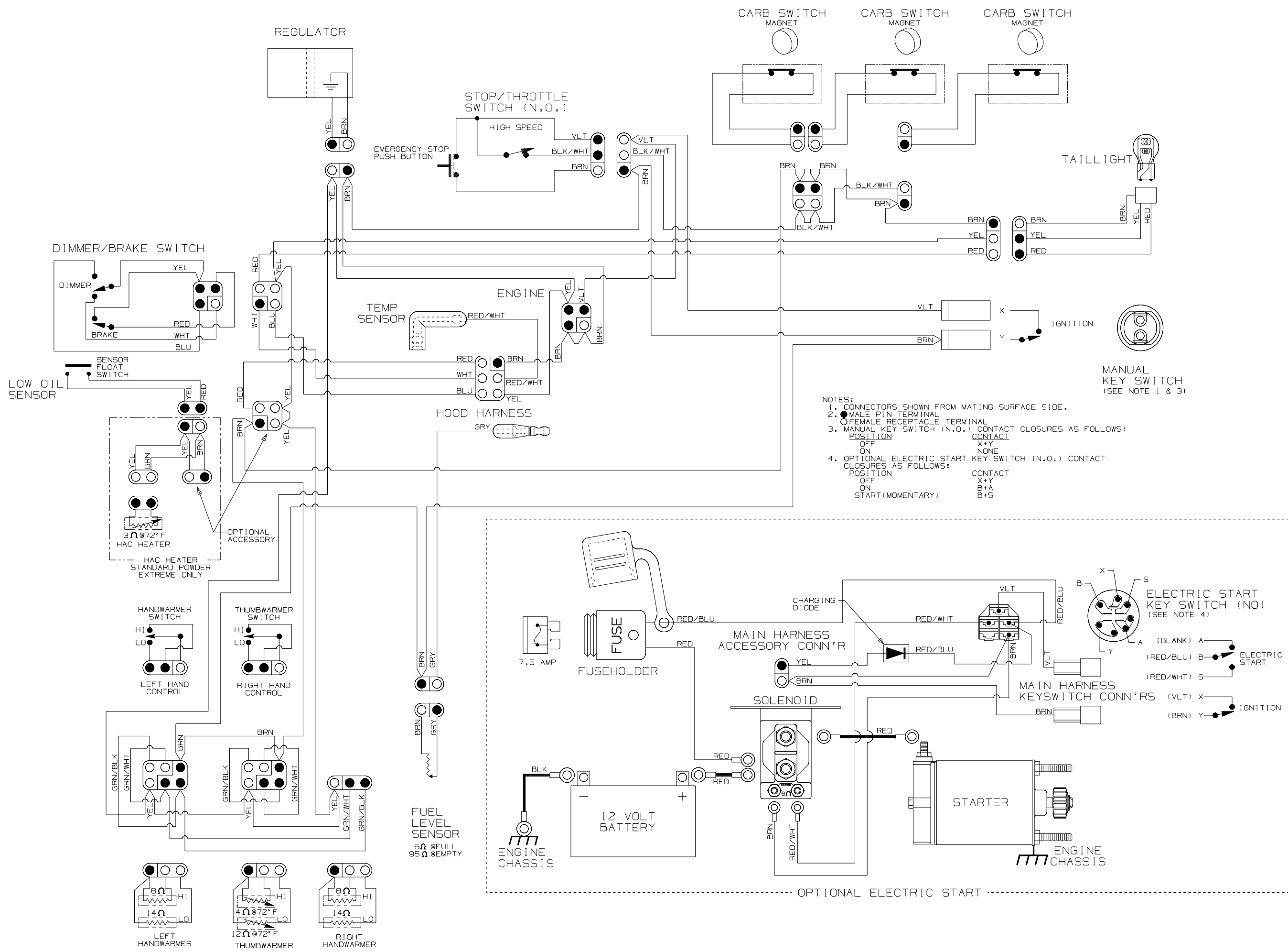
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Harness R



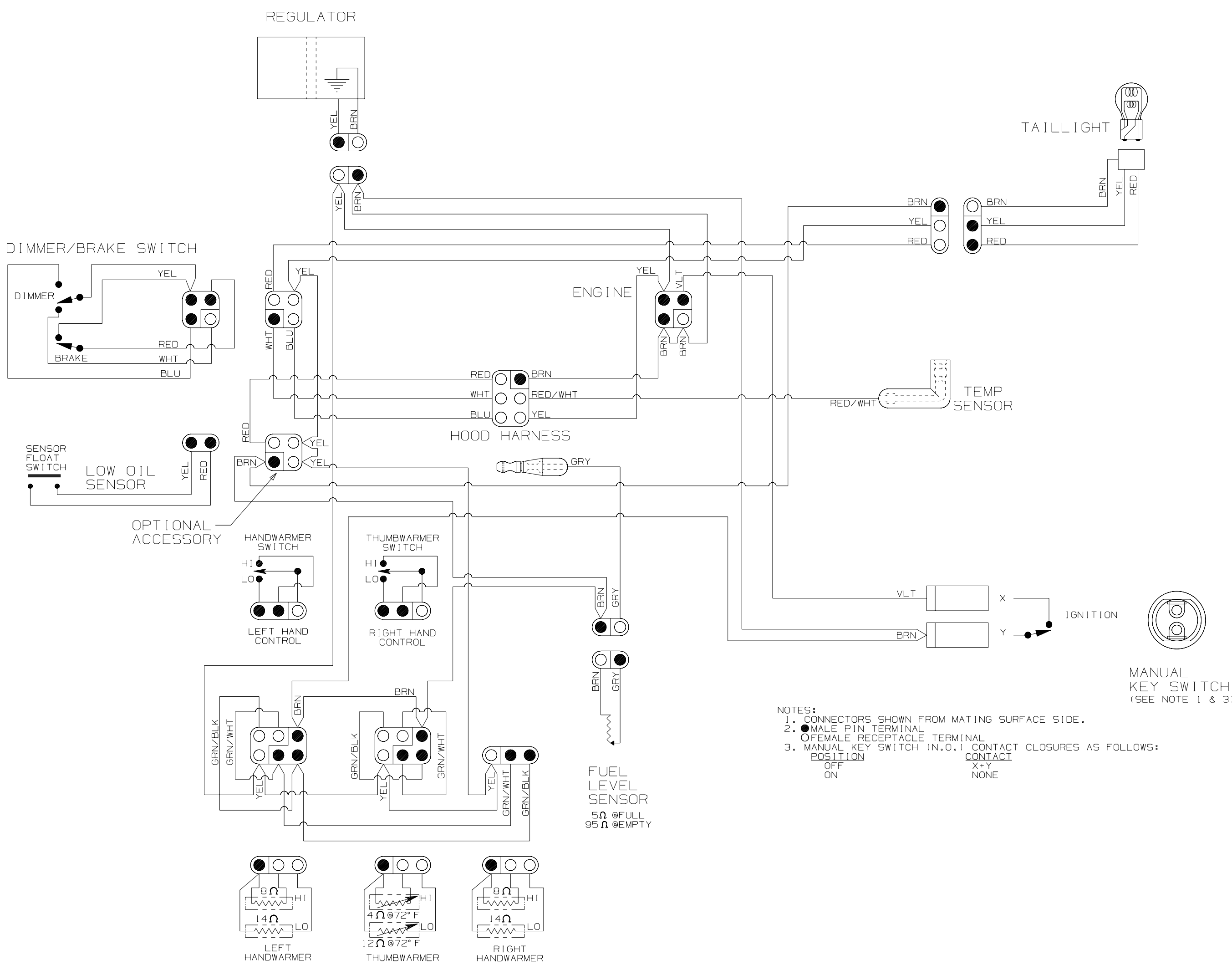
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Harness S



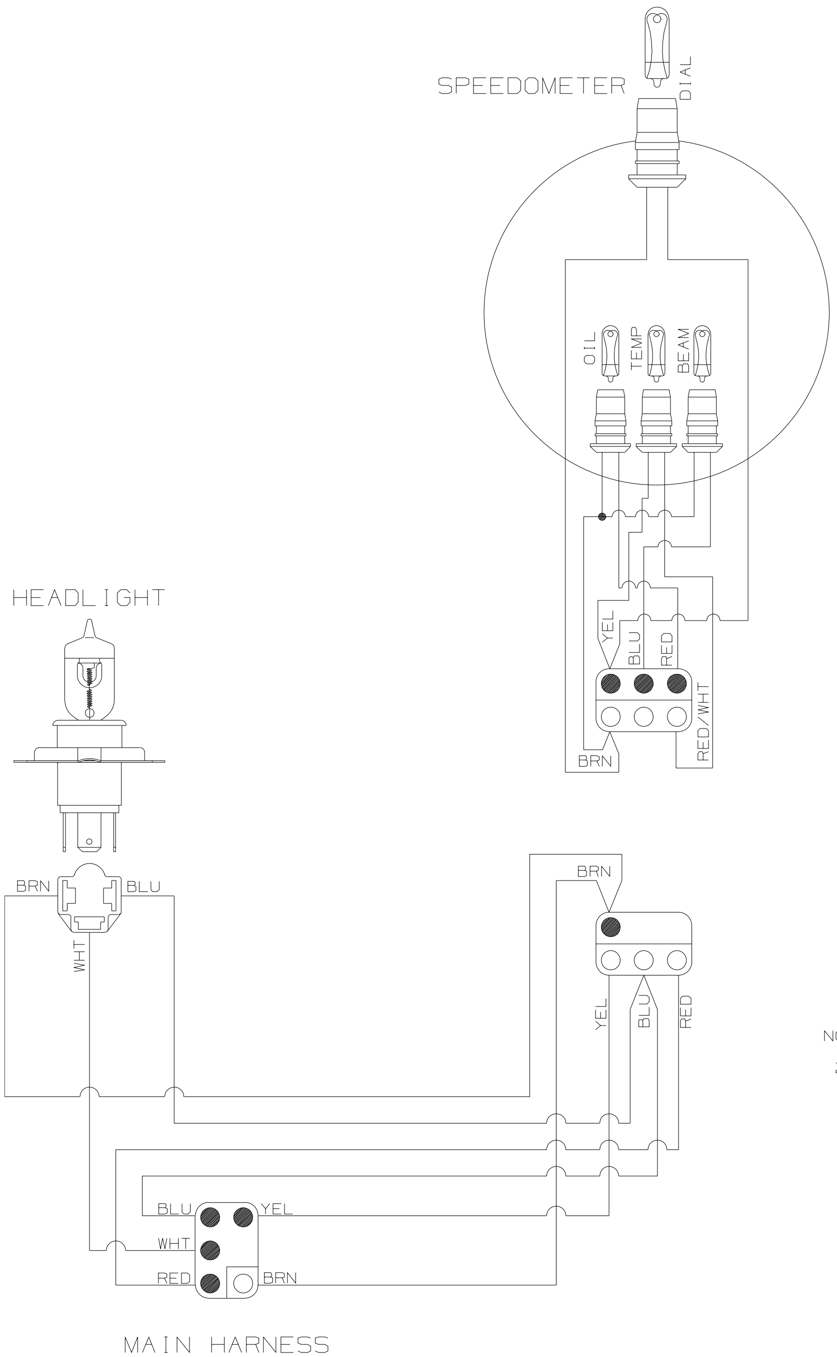
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Harness T



0686-659

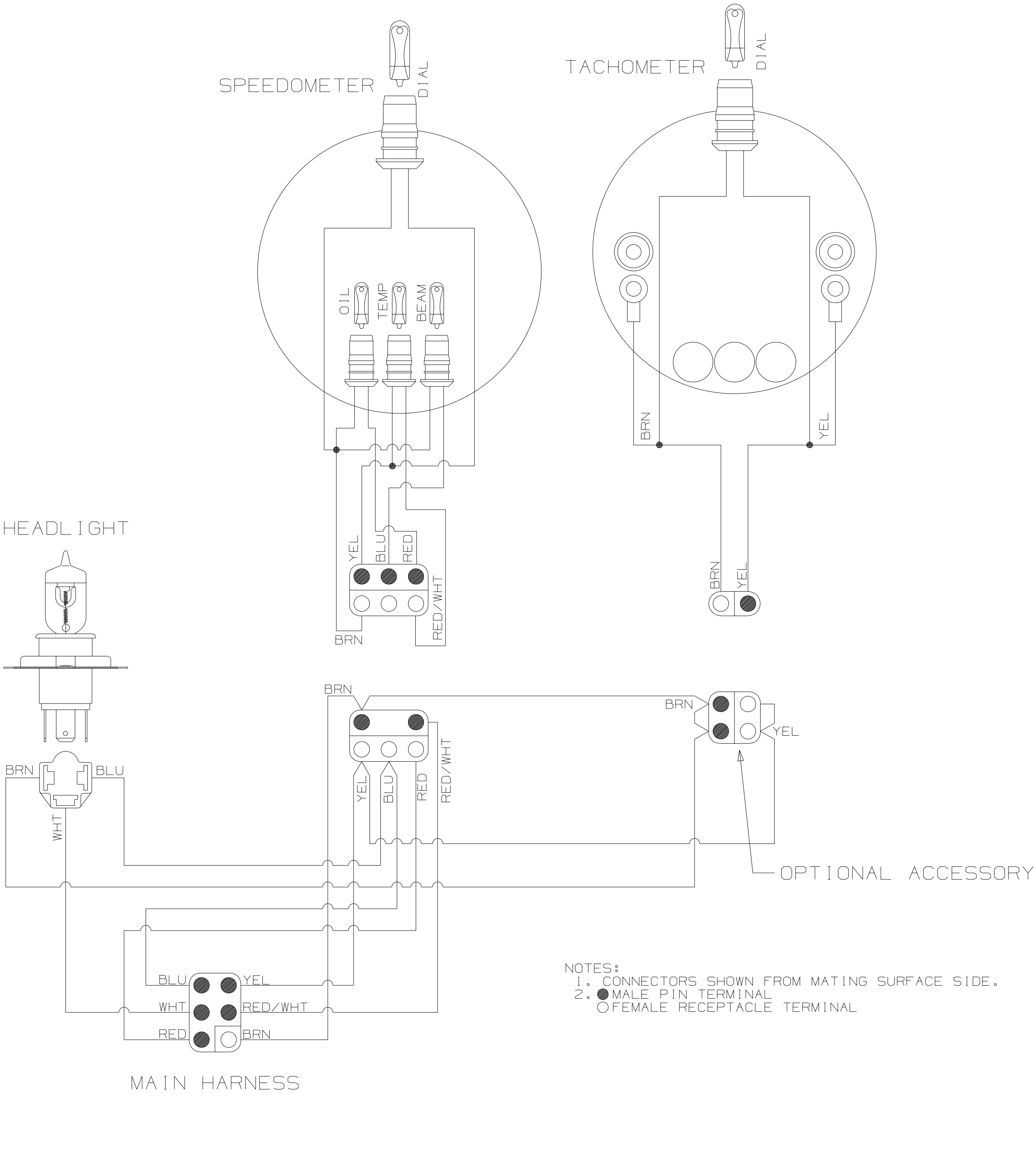
Harness I



NOTES:
1. CONNECTORS SHOWN FROM MATING SURFACE SIDE.
2. ● MALE PIN TERMINAL
○ FEMALE RECEPTACLE TERMINAL

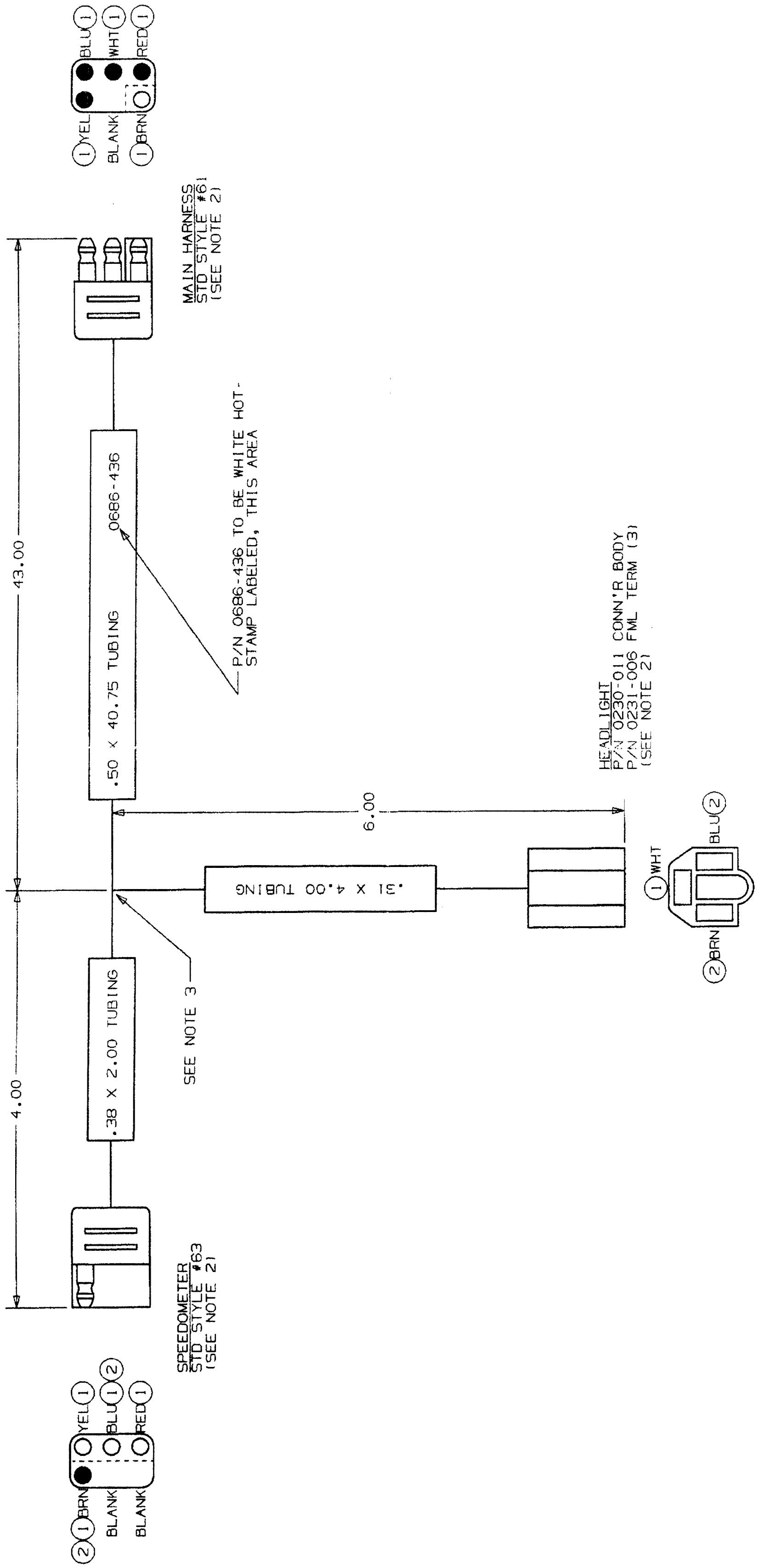
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Harness II



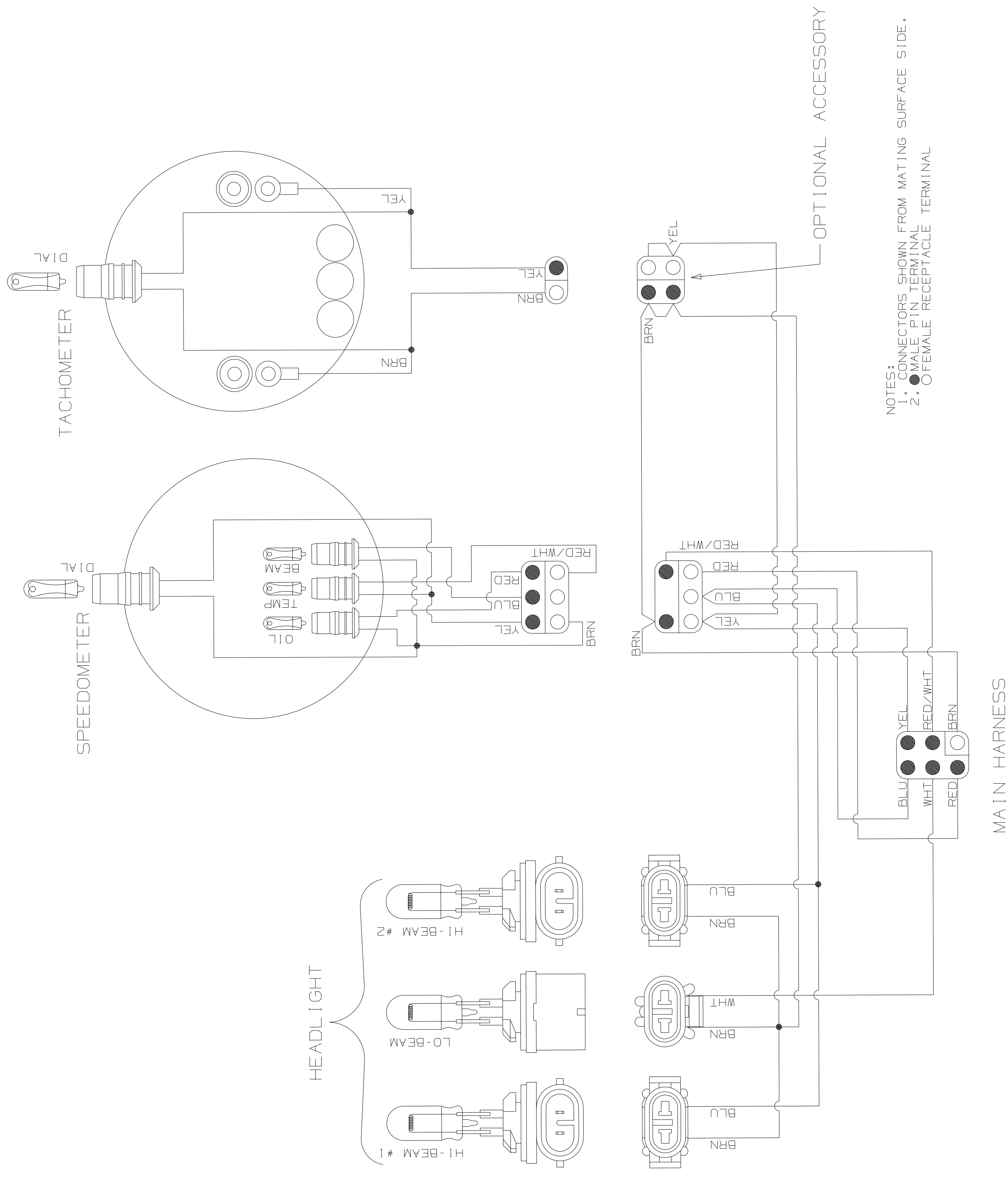
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Harness III



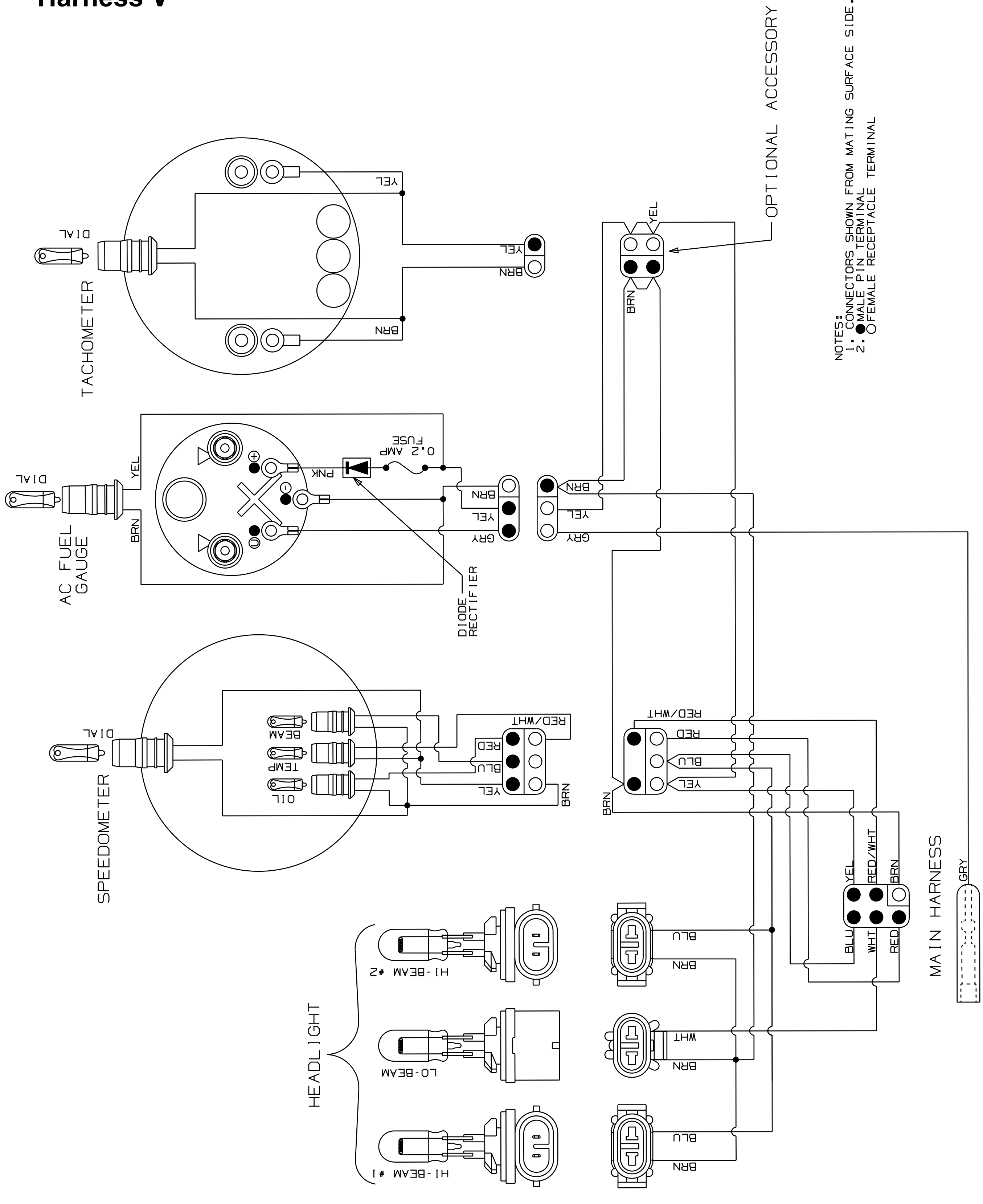
0686-436

Harness IV



0686-536

Harness V



0686-601

SECTION 7 — STEERING AND BODY

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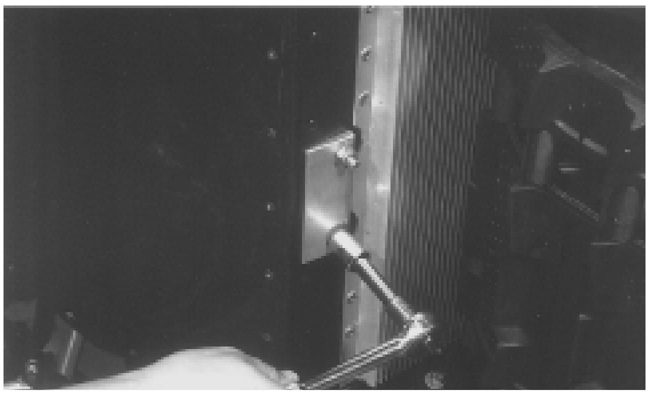
Steering Post
(AWS III)

REMOVING

1. Tip the snowmobile on its side. Remove the screws securing the skid plate.

2. Remove the two cap screws and lock nuts securing the lower steering post bracket to the front end assembly. Account for the two washers, bearing caps, bearing halves, and washers.

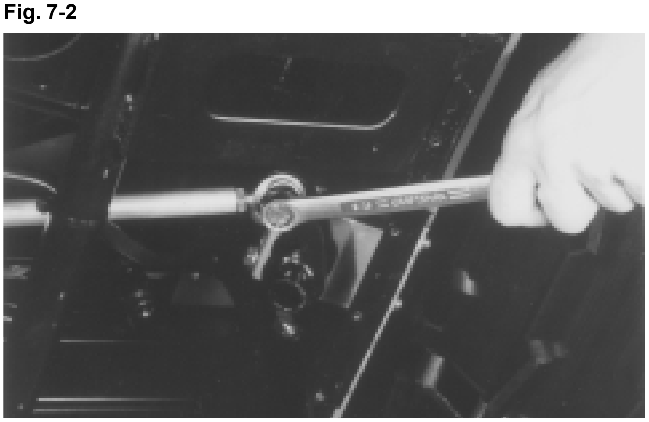
Fig. 7-1



AL046

3. Remove the cotter pin, cap screw, and lock nut securing the steering arm to the steering post.

Fig. 7-2



AL089

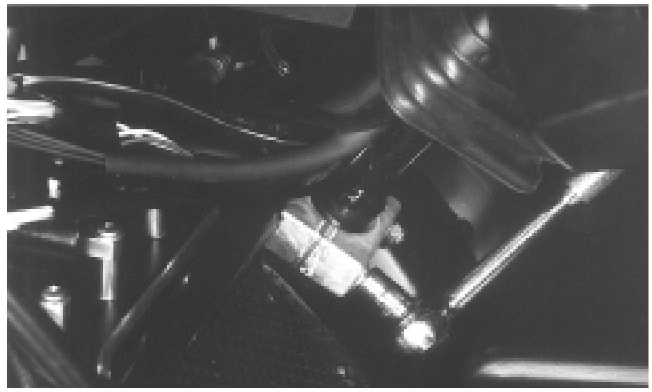
4. Tip the snowmobile upright. Remove the handlebar pad.

5. Remove the four lock nuts and cap screws securing the adjuster caps to the adjuster block; then remove the caps. Place the handlebar assembly to the side. Remove the adjuster block.

6. Remove the four machine screws securing the console.

7. Remove the two cap screws and lock nuts securing the steering post to the steering support. Account for the backing plate, two washers, bearing caps, bearing halves, and washers.

Fig. 7-3



AL090

8. Carefully slide the steering post out of the chassis. Be careful not to hook any wires or hoses.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

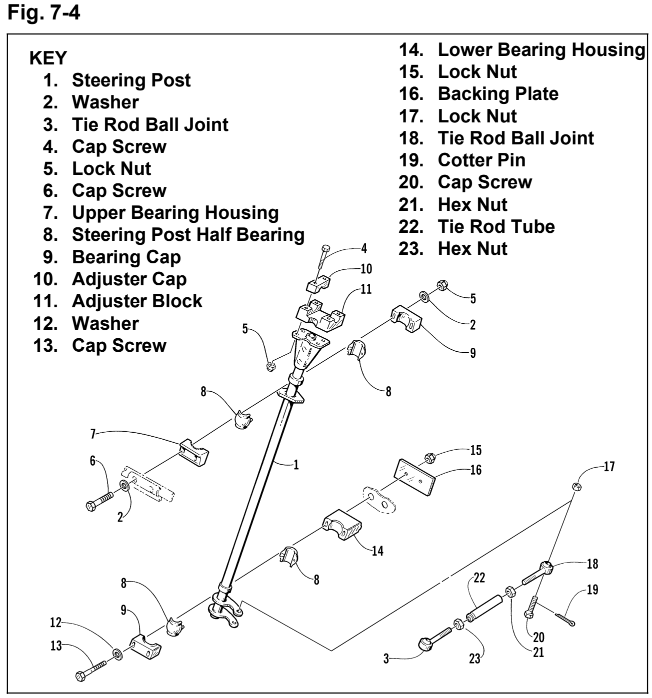
1. Inspect all welded areas for cracks or deterioration.

2. Inspect the steering post and steering-post brackets for cracks, bends, or wear.

3. Inspect the bearing halves, bearing caps, and bearing housings for cracks or wear.

INSTALLING

Fig. 7-4

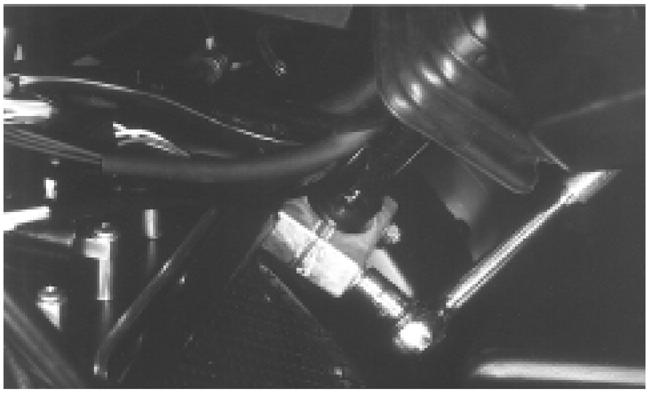


0730-785

1. Carefully slide the steering post into position in the chassis. Be careful not to hook any wires or hoses.

2. On the upper end of the steering post, apply a light oil to the bearing halves and place into position around the steering post; then place the bearing cap between the steering support and the steering post. Place the bearing housing into position and secure with two cap screws, washers, and lock nuts. Tighten to 2.5 kg-m (18 ft-lb).

Fig. 7-5



AL090

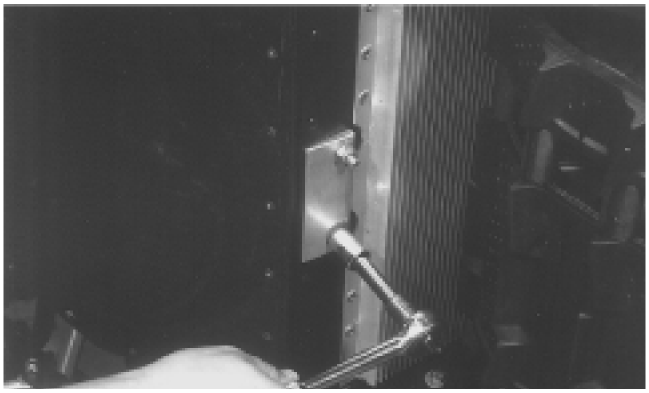
3. Secure the console with the machine screws. Make sure all wiring connections are secure.

4. Place the adjuster block, handlebar assembly, and adjuster caps into position; then secure with four cap screws and lock nuts. Tighten lock nuts evenly to 1.4 kg-m (10 ft-lb).

5. Install the handlebar pad.

6. Tip the snowmobile on its side. On the lower end of the steering post, apply a light oil to the bearing halves and place into position around the steering post; then place the bearing cap and bearing housing into position. Install the backing plate and secure with two cap screws, washers, and lock nuts. Tighten to 2.5 kg-m (18 ft-lb).

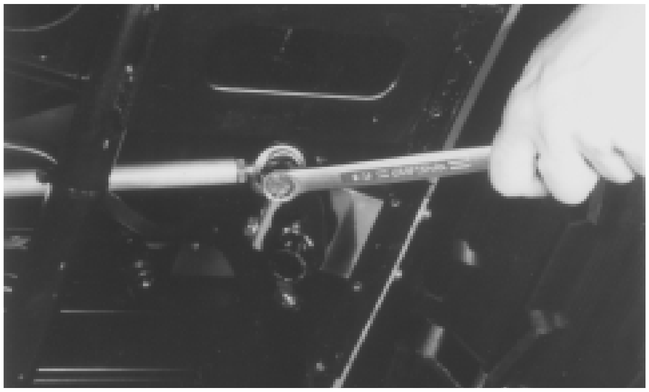
Fig. 7-6



AL046

7. Place the tie rod into position. Secure with a cap screw (coated with green Loctite #609) and lock nut. Tighten to 4.2 kg-m (30 ft-lb). Install the cotter pin and spread the pin.

Fig. 7-7



AL089

8. Install the skid plate. Secure with screws.

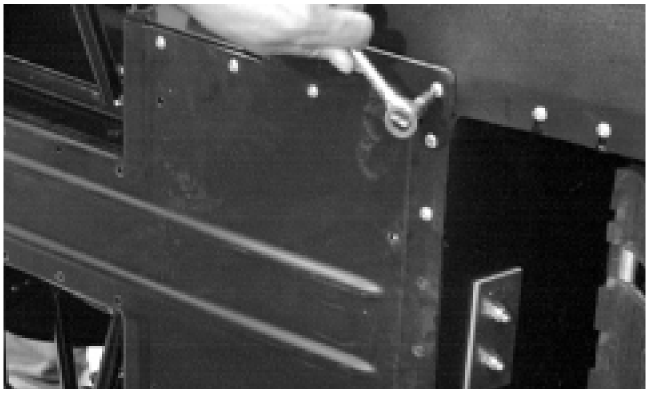
■ **NOTE: Turn the handlebar to the full-left and full-right to ensure free movement.**

Steering Post
(AWS V)

REMOVING

1. Tip the snowmobile on its side. Remove the screws securing the skid plate.

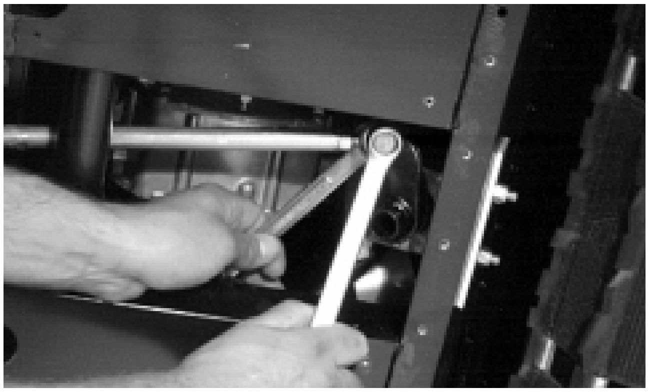
Fig. 7-8



AL144D

2. Remove the cotter pin, cap screw, and lock nut securing the tie rod to the steering post.

Fig. 7-9



AL146D

3. Remove the two cap screws and lock nuts securing the lower steering post bracket to the front end assembly. Account for the backing plate, two washers, bearing caps, bearing halves, and washers.

Fig. 7-10



AL145D

4. Tip the snowmobile upright. Remove the handlebar pad.

Fig. 7-11



AL136D

5. Remove the four lock nuts and cap screws securing the adjuster caps to the adjuster block; then remove the caps. Place the handlebar assembly to the side. Remove the adjuster block.

Fig. 7-12



AL147D

6. Remove the Phillips-head screws securing the console to the gas tank.

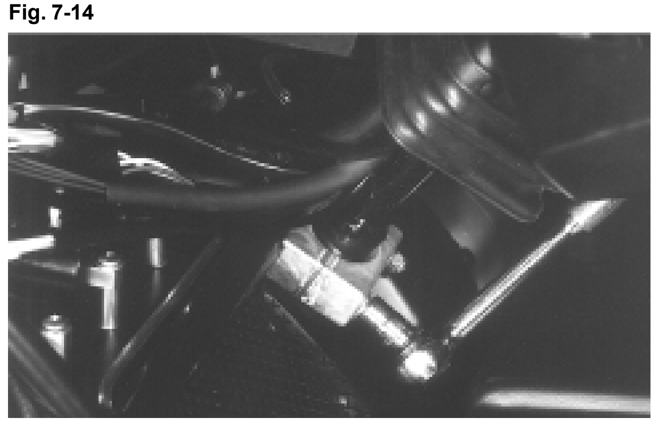
Fig. 7-13



AL142D

7. Remove the two cap screws and lock nuts securing the steering post to the steering support. Account for the two washers, bearing caps, bearing halves, washers, and backing plate.

Fig. 7-14



AL090

8. Remove the sheet metal screws securing the recoil starter rope cup.

Fig. 7-15



AL149D

9. Remove the cap screws securing the recoil starter rope wire form. Account for the lock nut.

Fig. 7-16



AL150D

10. Remove the cap screws securing the steering support to the footrest (both sides).

Fig. 7-17



AL151D

11. Remove the cap screws securing the oil reservoir to the steering support. Account for the lock nut and a flat washer.

Fig. 7-18



AL152D

12. Remove the cap screws securing the air-intake silencer to the steering support. Account for the washers, lock washers, and spacers.

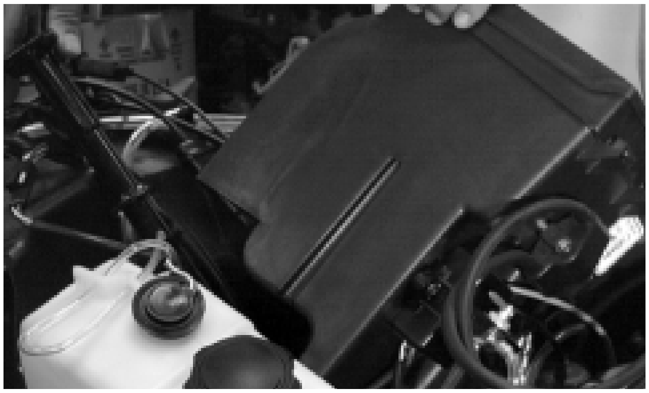
Fig. 7-19



AL153D

13. Move the air-intake silencer forward.

Fig. 7-20



AL154D

14. Carefully slide the steering post out of the chassis. Be careful not to hook any wires or hoses.

7

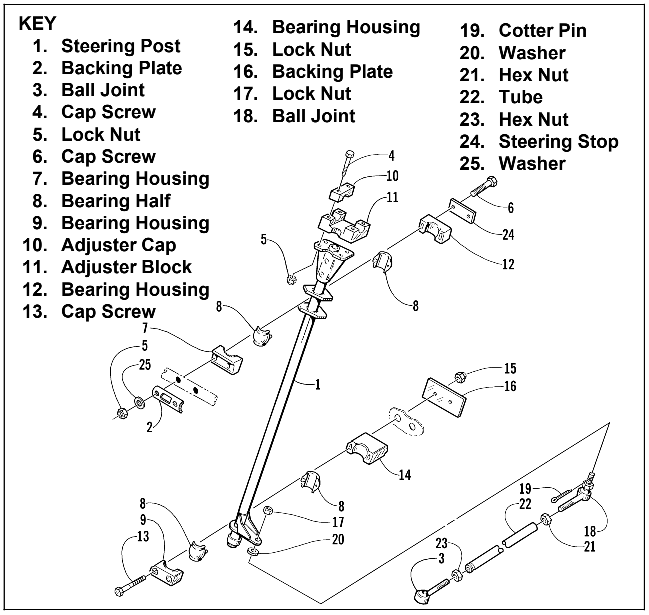
INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect all welded areas for cracks or deterioration.
2. Inspect the steering post and steering-post brackets for cracks, bends, or wear.
3. Inspect the bearing halves, bearing caps, and bearing housings for cracks or wear.

INSTALLING

Fig. 7-21



0734-129

1. Carefully slide the steering post into position in the chassis. Be careful not to hook any wires or hoses.
2. Secure the air-intake silencer to the steering support with the washers, lock washers, spacers, and cap screws.

Fig. 7-22



AL153D

3. Secure the oil reservoir to the steering support with the washer and lock nut.

Fig. 7-23



AL152D

4. Secure the steering support to the footrest (both sides) with the cap screws.

Fig. 7-24



AL151D

5. Secure the recoil starter rope wire form with the cap screws and lock nut.

Fig. 7-25



AL150D

6. Secure the recoil starter rope cup with the sheet metal screws.

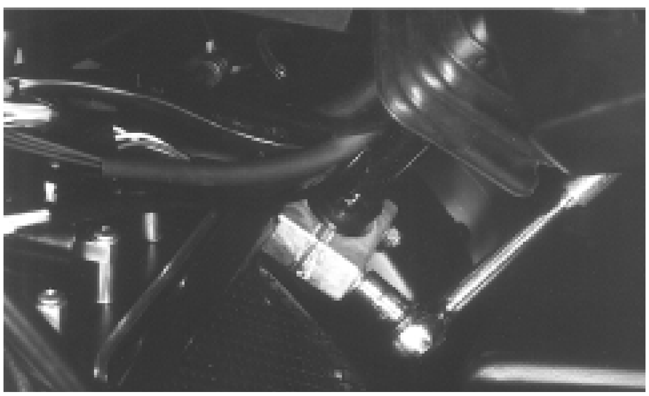
Fig. 7-26



AL149D

7. On the upper end of the steering post, apply a light oil to the bearing halves and place into position around the steering post; then place the bearing cap between the steering support and the steering post. Place the bearing housing into position and secure with the backing plate, two cap screws, washers, and lock nuts. Tighten to 2.5 kg-m (18 ft-lb).

Fig. 7-27



AL090

8. Secure the console with the Phillips-head screws.

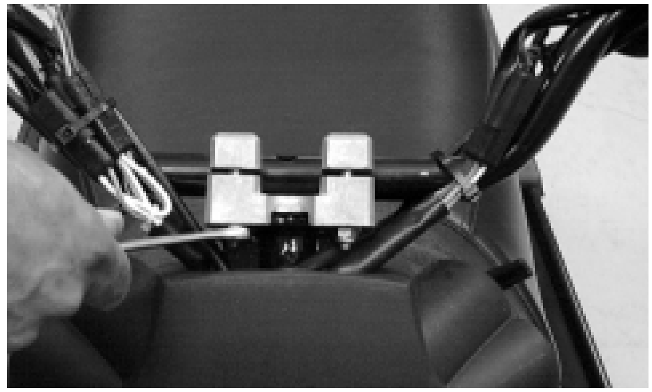
Fig. 7-28



AL142D

9. Place the adjuster block, handlebar assembly, and adjuster caps into position; then secure with four cap screws and lock nuts. Tighten lock nuts evenly to 1.4 kg-m (10 ft-lb).

Fig. 7-29



AL147D

10. Secure the handlebar pad.

Fig. 7-30



AL136D

11. Tip the snowmobile on its side; then place the tie rod into position. Secure with a cap screw (coated with green Loctite #609) and lock nut. Tighten to 4.2 kg-m (30 ft-lb). Install the cotter pin and spread the pin.

Fig. 7-31



AL146D

12. On the lower end of the steering post, apply a light oil to the bearing halves and place into position around the steering post; then place the bearing cap and bearing housing into position. Install the backing plate and secure with two cap screws, washers, and lock nuts. Tighten to 2.5 kg-m (18 ft-lb).

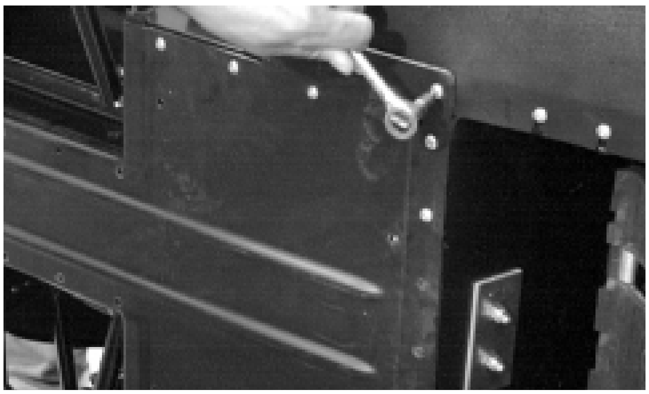
Fig. 7-32



AL145D

13. Install the skid plate. Secure with screws.

Fig. 7-33



AL144D

■ **NOTE: Turn the handlebar to the full-left and full-right to ensure free movement.**

Ski
(Plastic)

REMOVING

1. Place the front of the snowmobile on a support stand.

2. Remove the cotter pin; then remove the slotted nut and cap screw securing the ski assembly to the spindle. Remove the ski. Account for the rubber damper and washers.

Fig. 7-34



AL095D

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the ski for cracks or deterioration.

2. Inspect the ski for abnormal bends or cracks.

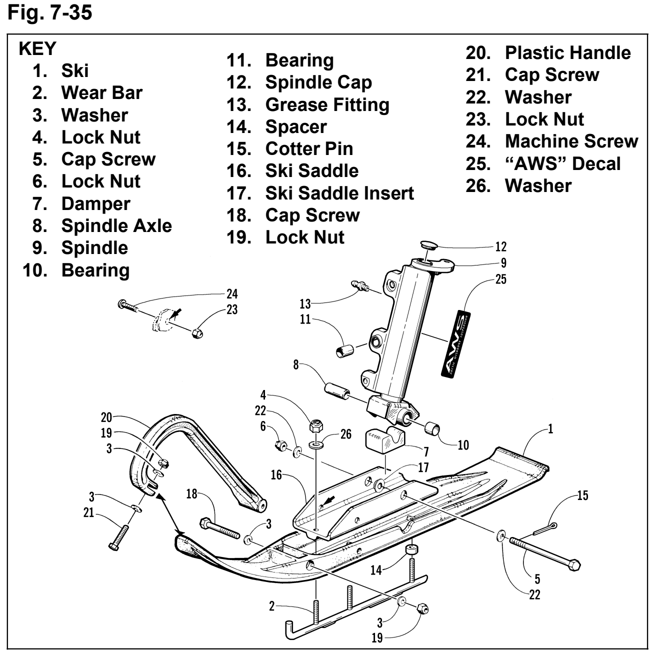
3. Inspect the wear bar for wear.

4. Inspect all hardware and the spindle bushings for wear and damage.

5. Inspect the rubber damper for damage or wear.

INSTALLING

Fig. 7-35



0735-113

1. Position the ski over the saddle.

2. Apply a low-temperature grease to the non-threaded portion of the cap screw; then slide the cap screw (with washer as required) through the ski and saddle accounting for the rubber damper.

■ **NOTE: Install the cap screw so the lock nut will be located to the inside of the ski.**

3. Apply red Loctite #271 to the threads of the cap screw; then tighten the lock nut (with washer as required) to 6.2 kg-m (45 ft-lb).

4. Place the cotter pin into the ski cap screw and spread the pin.

Ski
(Steel)

REMOVING

1. Place the front of the snowmobile on a safety stand.

2. Remove the cotter pin; then remove the slotted nut and cap screw securing the ski assembly to the spindle. Remove the ski. Account for the rubber damper.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the welded areas for cracks or deterioration.

2. Inspect the ski for abnormal bends or cracks.

3. Inspect the wear bar for wear.

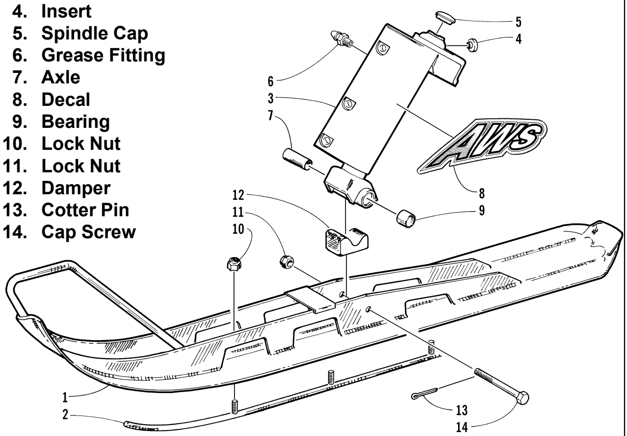
4. Inspect the rubber damper for damage or wear.

5. Inspect all hardware and the spindle bushings for wear and damage.

INSTALLING

Fig. 7-36

KEY
1. Ski
2. Wear Bar
3. Spindle Housing
4. Insert
5. Spindle Cap
6. Grease Fitting
7. Axle
8. Decal
9. Bearing
10. Lock Nut
11. Lock Nut
12. Damper
13. Cotter Pin
14. Cap Screw



0734-088

1. Place the ski and rubber damper up into position on the spindle.

■ **NOTE: Gently tap each rear corner of the spindle inward just enough to squeeze the rubber damper to hold it in position. The high end of the rubber damper should be positioned forward.**

2. Align the hole in each ski with the hole in each spindle; then apply low-temperature grease to the non-threaded area of each cap screw and slide the cap screw through the ski and spindle assembly. Be sure to position the cap screw so the slotted nut will be on the inside of the ski.

3. Set the snowmobile on the floor; then secure the cap screw (coated with red Loctite #271) with a washer (as required) and slotted nut. Tighten to 6.2 kg-m (45 ft-lb).

4. Place a cotter pin through the slotted nut and cap screw; then spread the cotter pin.

Drag Link

REMOVING

1. Remove the expansion chamber if necessary.

2. On one side, remove the lock nut securing the tie rod to the spindle. Account for an O-ring and washer.

■ **NOTE: Note whether the tie rod is installed on the top side or on the bottom side of the spindle arm for installing purposes.**

Fig. 7-37



AL108

Fig. 7-38

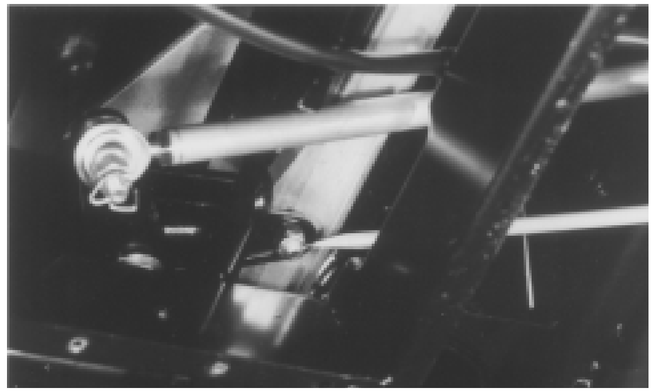


AL655D

3. On the side from which the tie rod was removed, remove the self-tapping screws securing the steering boot to the front end.

4. Remove the cap screws and lock nuts securing the steering and idler arms to the drag link. Account for any axles and washers.

Fig. 7-39



AL092

5. Turn the ski to gain access to the lock nut and cap screw securing the tie rod to the drag link on the opposite side from which the steering boot was removed; then remove the cap screw and lock nut. Account for washers.

6. Slide the drag link backward and twist upward to free the drag link of the two steering idler arms.

7. Slide the drag link out of the front end.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

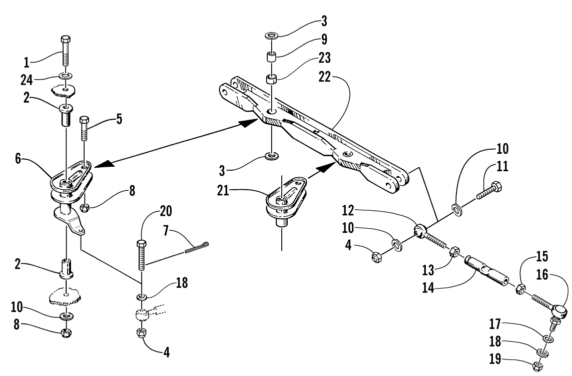
1. Inspect the entire drag link (especially in the areas where the ball joints attach) for any signs of cracks, wear, or damage.

2. Inspect the bearings, inserts, and axles for wear or damage.

INSTALLING

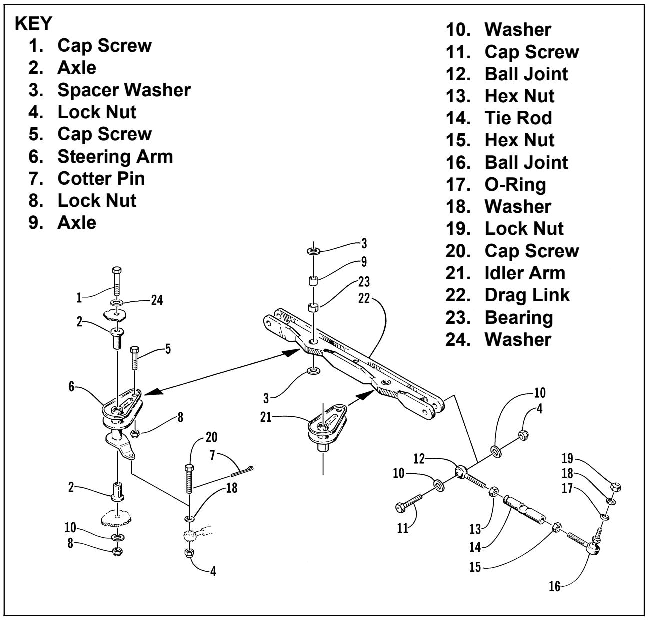
Fig. 7-40

KEY
1. Cap Screw
2. Axle
3. Spacer Washer
4. Lock Nut
5. Cap Screw
6. Steering Arm
7. Cotter Pin
8. Lock Nut
9. Axle
10. Washer
11. Cap Screw
12. Ball Joint
13. Hex Nut
14. Tie Rod
15. Hex Nut
16. Ball Joint
17. O-Ring
18. Washer
19. Lock Nut
20. Cap Screw
21. Idler Arm
22. Drag Link
23. Bearing
24. Washer



0735-191

Fig. 7-41



0734-207

1. Slide the drag link into position on the front end.

2. Opposite the end from which the steering boot was removed, secure the tie rod to the drag link with a cap screw, two washers, and a lock nut (threads coated with green Loctite #609). Tighten to 2.8 kg-m (20 ft-lb).

3. Apply a light coat of grease to the two drag link axles; then slide them into position in the drag link.

4. Place a washer on each side of the drag link axles; then position the axles into the steering arms. Secure the steering and idler arms to the drag link with two cap screws (coated with green Loctite #609) and lock nuts. Tighten to 4.2 kg-m (30 ft-lb).

Fig. 7-42



AL092

5. Place the remaining tie rod into position on the drag link. Secure with a cap screw (coated with green Loctite #609), two washers, and a lock nut. Tighten to 2.8 kg-m (20 ft-lb).

6. Place the steering boot into position on the front end. Secure with self-tapping screws.

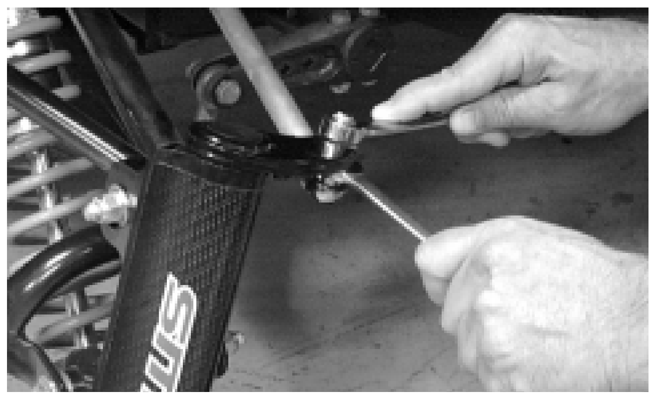
7. Install the tie rod (threaded area coated with green Loctite #609) on the spindle arm as noted during removing. Secure with an O-ring, washer, and nut. Tighten to 3.5 kg-m (25 ft-lb).

Fig. 7-43



AL108

Fig. 7-44



AL655D

■ **NOTE: Check all drag link and ball joint fasteners to ensure they are tight. Turn the handlebars full-left and full-right several times to ensure free movement.**

8. Install and secure the expansion chamber (if removed).

9. Check and adjust ski alignment (see Ski Alignment in this section).

7

Front Tie Rods

REMOVING AND DISASSEMBLING

1. Remove the lock nut securing the tie rod to the spindle. Account for a washer and O-ring.

■ **NOTE: Note whether the tie rod is installed on the top side or on the bottom side of the spindle arm for installing purposes.**

Fig. 7-45



AL108

Fig. 7-46



AL655D

2. Remove the self-tapping screws or rivets securing the steering boot and retainer to the front end.

3. Turn the handlebar in the appropriate direction; then remove the cap screw and lock nut securing the steering arm to the drag link. Account for washers.

4. Loosen the jam nut securing each ball joint to the tie rod; then remove the ball joints from the tie rod. Slide the rod from the steering boot. Remove the jam nuts from the ball joints.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the ball joints and tie rods for damaged threads or wear.

2. Inspect the ball joints and tie rods for cracks or unusual bends.

3. Wash the ball joints in parts-cleaning solvent. Dry with compressed air. Inspect the ball joint pivot area for wear. Apply a low-temperature grease to the ball joints.

⚠ WARNING

Always wear safety glasses when using compressed air.

ASSEMBLING AND INSTALLING

1. Slide the tie rod through the steering boot and retainer; then install the jam nuts on the ball joints and thread the ball joints onto the tie rod.

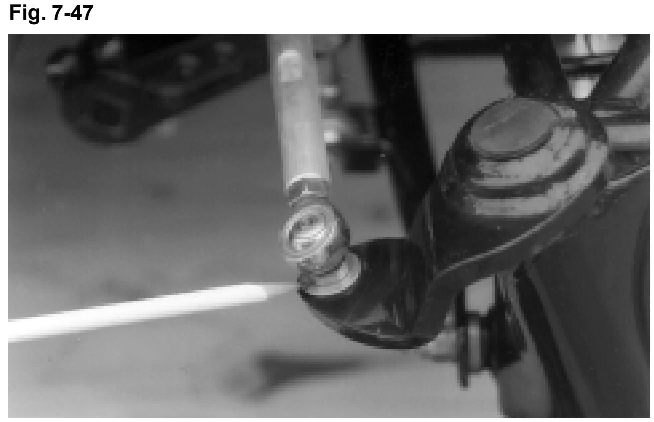
■ **NOTE: Each jam nut and ball joint is either a right-hand or left-hand thread; therefore, each can only be installed on one end of the tie rod. The right-hand thread is the inside ball joint and jam nut.**

2. Secure the tie rod to the ball joint on the forked end of the drag link with a cap screw, washers, and lock nut. Tighten to 2.8 kg-m (20 ft-lb).

3. Secure the steering arm to the drag link with a cap screw, lock nut, and washers. Tighten to 4.2 kg-m (30 ft-lb).

4. Position an O-ring and washer on the ball joint assembly (threads coated with green Loctite #609). Install the ball joint on the spindle arm as noted in removing; then secure with a lock nut. Tighten to 3.5 kg-m (25 ft-lb).

Fig. 7-47



AL108

Fig. 7-48



AL655D

5. Place the steering boot and retainer into position and secure with self-tapping screws or rivets.

6. Adjust ski alignment (see Ski Alignment in this section).

7. Apply blue Loctite #242 to the jam nut threaded area and tighten the jam nuts against the tie rod to 1.7-2.1 kg-m (12-15 ft-lb).

⚠ WARNING

Neglecting to lock the jam nuts against the tie rod may cause loss of snowmobile control and possible personal injury.

Spindle

REMOVING

1. Position the front of the snowmobile up on a safety stand.

2. Remove the ski.

3. Remove the lock nut and cap screw securing the shock absorber to the spindle. Account for all mounting hardware.

Fig. 7-49



AL156D

4. Remove the lock nut securing the tie-rod ball joint to the spindle (account for the washer and the O-ring); then remove the ball joint from the spindle.

■ NOTE: Note whether the tie rod is installed on the top side or on the bottom side of the spindle arm for installing purposes.

Fig. 7-50



AL158D

Fig. 7-51



AL655D

5. Remove the two cap screws and lock nuts securing the spindle to the suspension arms. Account for all mounting hardware.

Fig. 7-52



AL159D

7

Fig. 7-53



AL160D

6. Inspect the tie-rod ball joint in place. If damage, wear, or unusual bends are noted, loosen the jam nut; then remove the ball joint from the tie rod.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the spindle for excessive wear, cracks, bends, or imperfections.

2. Inspect all welds for cracking.

3. Inspect the suspension arm bushings and axle area for wear.

4. Secure the spindle in a vise. Rotate the spindle clockwise and counterclockwise. The movement should be smooth and free. If the spindle movement is rough or binding, grease the spindle with a good low-temperature grease. Rotate the spindle. If the movement remains rough, replace the spindle.

■ **NOTE: When greasing the spindle, use enough grease so that it can be seen coming out at both the top and bottom of the spindle.**

5. Inspect the spindle axle and bearings for wear, damage, or loose fit. Replace the bearings as a set.

■ **NOTE: Replacing the ski bolt bushings is difficult. The existing bushings will be damaged during removal. Be careful, however, not to damage the spindle when removing the bearing. Press the new bushings into the spindle.**

INSTALLING

1. Place the upper and lower suspension arm ends with bushings in position into the spindle. Secure with cap screws and lock nuts. Tighten to 4.2 kg-m (30 ft-lb).

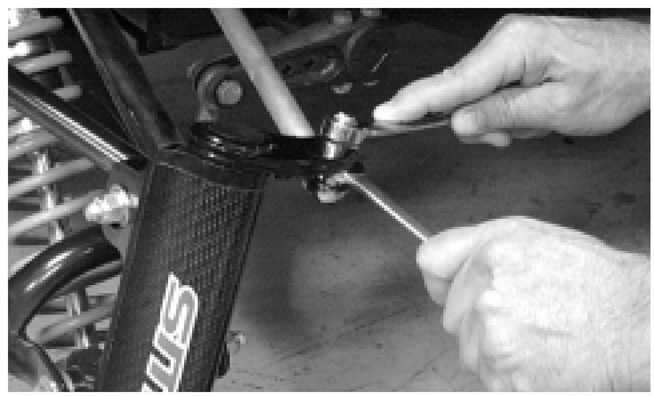
2. Place the steering tie-rod ball joint into position (threads coated with green Loctite #609) on the spindle arm as noted during removing (with washer and O-ring) and secure with a lock nut. Tighten to 3.5 kg-m (25 ft-lb).

Fig. 7-54



AL108

Fig. 7-55



AL655D

3. Install the ski.

4. Align the lower shock eyelet with the mounting hole in the spindle; then secure with the cap screw, optional washers, and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

5. Remove the safety stand from beneath the front end.

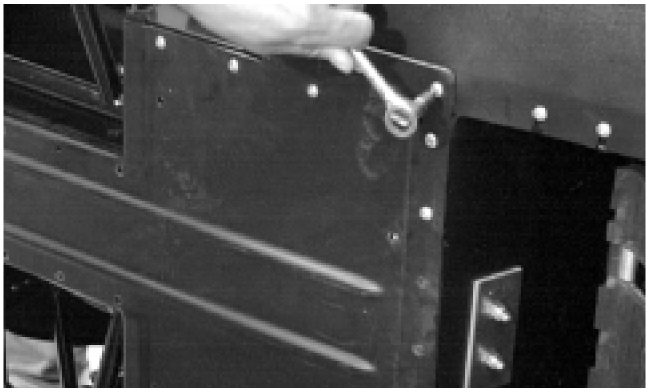
Steering Tie Rod

REMOVING

1. Remove the screws securing the skid plate; then remove the skid plate.

■ **NOTE: The front machine screw on some models is secured with a washer and lock nut.**

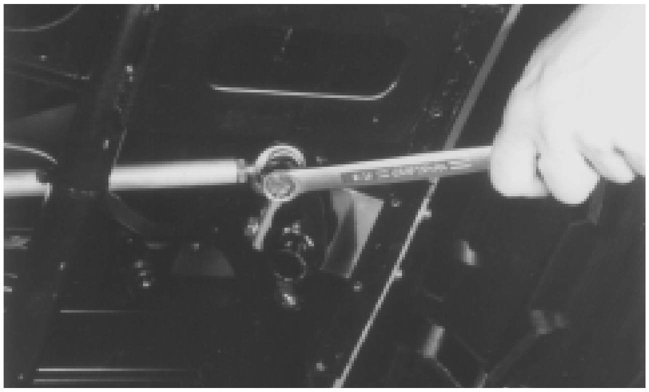
Fig. 7-56



AL144D

2. Remove the cotter pins, cap screws, and slotted nuts securing the steering tie rod to the steering post and steering arm; then remove the tie-rod assembly.

Fig. 7-57



AL089

3. Loosen the jam nuts securing the ball joints to the steering tie rod; then remove the ball joints.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the ball joints for damaged threads or wear.

2. Inspect the tie rod for damage, unusual bends, or wear.

INSTALLING

1. Position the handlebar in the straight-ahead position; then position the skis straight ahead.

2. Thread the jam nuts onto the ball joints; then equally thread the ball joints onto the steering tie rod.

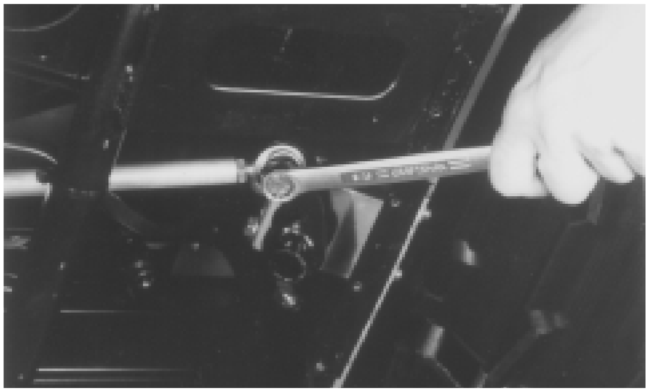
■ **NOTE: There must be an approximate equal number of threads exposed on each ball joint.**

3. Place the tie-rod assembly into position; then rotate the steering tie rod until the holes in the ball joints align with the holes in the steering post and steering arm.

4. Ensure correct handlebar/ski alignment (adjust steering tie rod as necessary); then apply blue Loctite #242 to the jam nut threaded area and tighten to 1.7-2.1 kg-m (12-15 ft-lb).

5. Secure the tie-rod assembly with the two cap screws (coated with green Loctite #609), washers, and slotted nuts. Tighten to 4.2 kg-m (30 ft-lb); then install the cotter pins and spread the cotter pins.

Fig. 7-58



AL089

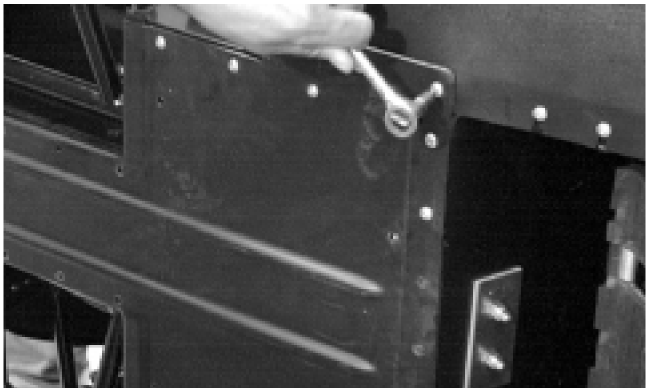
⚠ WARNING

Neglecting to lock the jam nuts against the tie rod may cause loss of snowmobile control and possible personal injury.

6. Install the skid plate; then secure with screws.

■ **NOTE: The front machine screw on some models is secured with a washer and lock nut.**

Fig. 7-59



AL144D

7

Ski Alignment

CHECKING

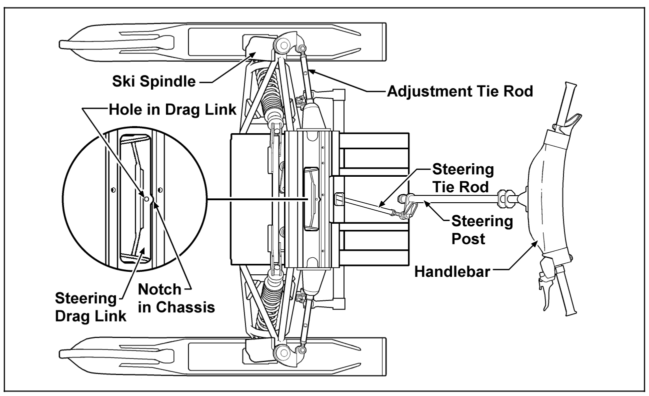
Toe-Out Range
1.6 - 6.4 mm (1/16 - 1/4 in.)

■ **NOTE: Track tension and alignment must be properly adjusted prior to checking or adjusting ski alignment. Ski alignment must be performed on a flat, level surface. Ski toe-out must fall within the range of 1.6 - 6.4 mm (1/16 - 1/4 in.).**

1. Raise the front end of snowmobile just high enough to keep the skis from contacting the floor; then tighten the ski mounting cap screws to 3.6 kg-m (26 ft-lb).

2. Turn the handlebar to the straight-ahead position until the hole in the middle of the drag link is aligned with the notch (half-moon shaped) in the chassis. Visually inspect the handlebar for being centered and in the straight-ahead position.

Fig. 7-60



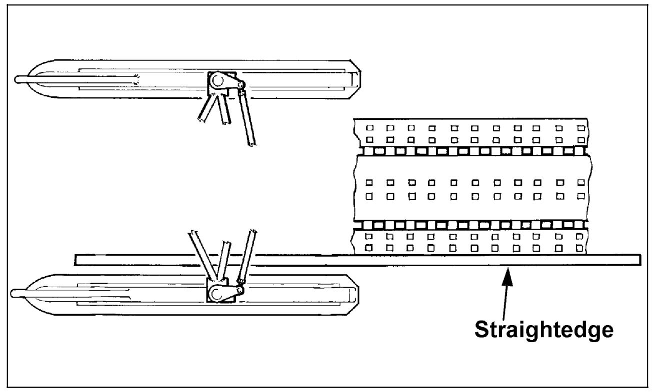
■ **NOTE: If the handlebar is not in the straight-ahead position when the hole in the middle of the drag link aligns with the notch in the chassis, the steering tie rod must be adjusted. When handlebar alignment is correct, apply blue Loctite #242 to the jam nut threaded area and tighten to 1.7-2.1 kg-m (12-15 ft-lb). Tighten both jam nuts against the steering tie rod.**

3. With the drag link centered and handlebar in the straight-ahead position, secure the handlebar to prevent the drag link and handlebar alignment from becoming disturbed during the remainder of the alignment procedure.

■ **NOTE: Track tension and alignment must be properly adjusted prior to placing the straightedge against the outside edge of the track.**

4. Place a long straightedge against the outside edge of the track so it lies near the inside edge of the left-side ski.

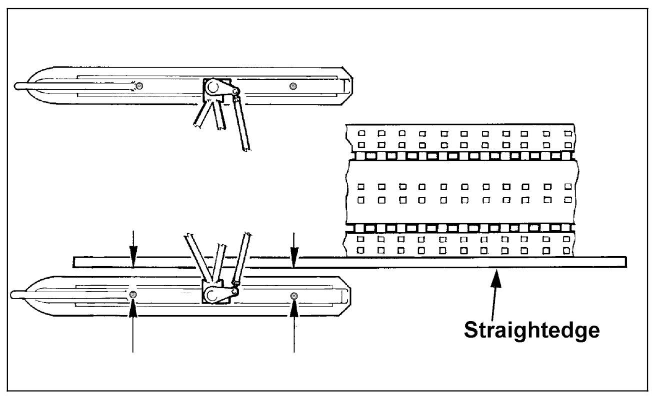
Fig. 7-61



■ **NOTE: The straightedge should be long enough to extend from the back of the track to the front of the ski.**

5. Measure the distance from the straightedge to the left-side ski wear bar bolts in two places: approximately 18-20 cm (7-8 in.) in front of the spindle and 18-20 cm (7-8 in.) behind the spindle. Record the measurements taken for the left side.

Fig. 7-62



6. Place the straightedge against the outside edge of the track so it lies near the inside edge of the right-side ski.

7. Measure the distance from the straightedge to the right-side ski wear bar bolts in two places: 18-20 cm (7-8 in.) in front of the spindle and 18-20 cm (7-8 in.) behind the spindle. Record the measurements taken for the right side.

⚠ WARNING

The measurement from the front and rear wear bar bolts to the straightedge can be equal (ski parallel to the track), but the front measurement must never be less (ski toed-in) or poor handling will be experienced. The front wear bar bolt measurement to the straightedge must not exceed the measurement from the rear wear bar bolt to the straightedge (ski toed-out) by more than 3.9 mm (5/32 in.).

8. If ski alignment is not as specified, adjust the alignment of the ski(s) not parallel to the straightedge.

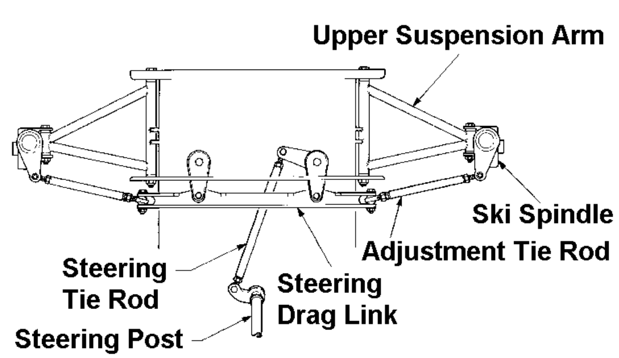
ADJUSTING

■ **NOTE: The following procedure can be used to adjust the alignment of either ski.**

1. Unlock the appropriate adjustment tie rod(s) by loosening the jam nuts.

■ **NOTE: The outside jam nuts are left-hand thread. Care should be taken to rotate them in the proper direction.**

Fig. 7-63



0729-883

2. Adjust ski alignment by rotating the adjustment tie rod.

3. When ski alignment is correct, apply blue Loctite #242 to the jam nut threaded area and tighten to 1.7-2.1 kg-m (12-15 ft-lb). Tighten both jam nuts against the tie rod.

⚠ WARNING

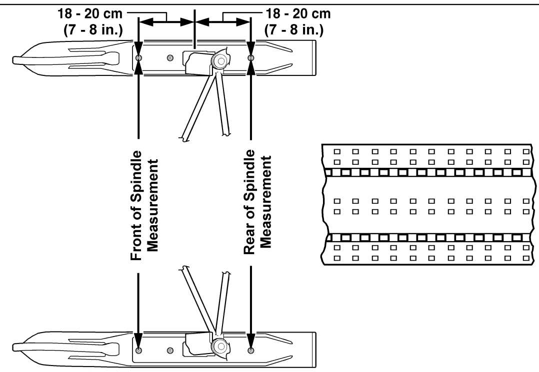
Neglecting to lock the tie rod by tightening the jam nuts may cause loss of snowmobile control and possible personal injury.

VERIFYING

1. With the drag link centered and handlebar in the straight-ahead position, verify ski alignment by measuring across from the outside edge of the left-side wear bar bolts to the outside edge of the right-side wear bar bolts (without using the straightedge) in two places: approximately 18-20 cm (7-8 in.) in front of the spindle and 18-20 cm (7-8 in.) behind the spindle.

2. The measurement from in front of the spindle to the outer edge of the wear bar bolts (without using the straightedge) must not exceed the rear measurement by more than 1.6 - 6.4 mm (1/16 - 1/4 in.) toe-out.

Fig. 7-64



0734-408

⚠ WARNING

The measurement taken in front of the spindle must never be less than the measurement taken behind the spindle or poor handling will be experienced. Neglecting to lock the tie rod by tightening the jam nuts may cause loss of snowmobile control and possible personal injury.

Front Suspension Arms

REMOVING

1. Remove the expansion chamber if necessary.

2. Position the front of the snowmobile up onto a safety stand.

3. Remove the lock nuts and cap screws securing the shock absorber; then remove the shock absorber. Account for all mounting hardware.

Fig. 7-65



AL156D

4. Remove the cap screws and lock nuts securing the spindle to the front suspension arms. Account for all mounting hardware.

Fig. 7-66



AL159D

Fig. 7-67

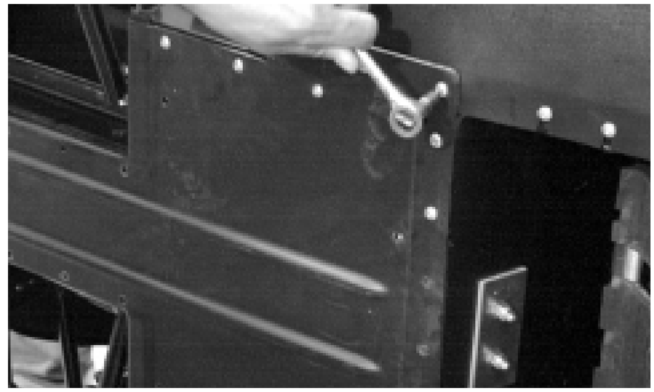


AL160D

5. On models with a sway bar, remove the cap screw and lock nut securing the sway bar link to the front suspension arm.

6. Remove the screws and lock nut securing the skid plate; then remove the skid plate.

Fig. 7-68



AL144D

7. If applicable, remove the self-tapping screws securing the steering boot to the front end.

8. Remove the cap screws and lock nuts securing the suspension arms to the front end; then remove the arms.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the arm welded areas for cracks or any signs of deterioration.

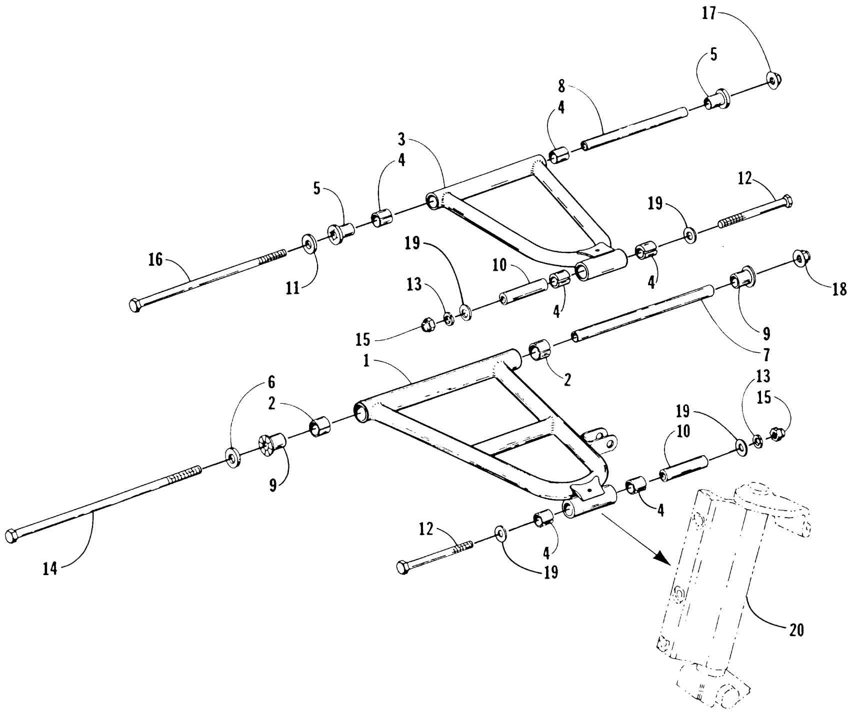
2. Inspect the bearings and axles for wear or damage.

3. Inspect the arm tubing for signs of twisting or bending.

INSTALLING

Fig. 7-69

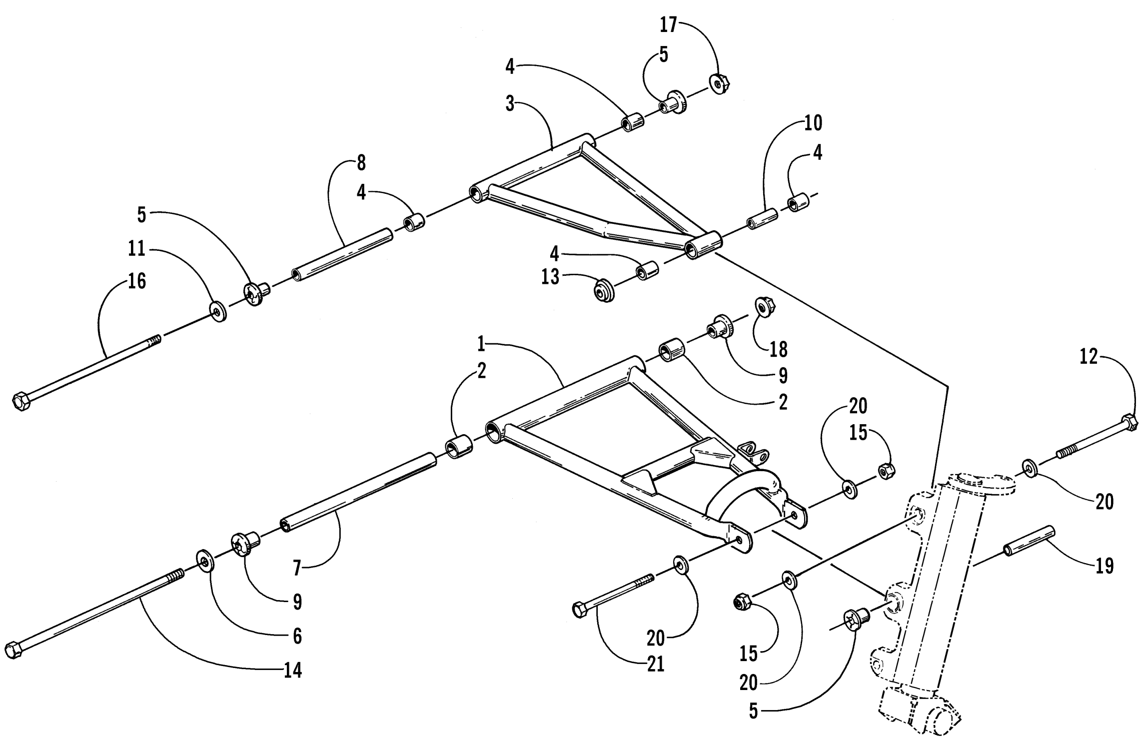
KEY
1. Lower Arm
2. Bearing
3. Upper Arm
4. Bearing
5. Serrated Axle
6. Washer
7. Tube
8. Tube
9. Axle
10. Axle
11. Washer
12. Cap Screw
13. Lock Washer
14. Cap Screw
15. Lock Nut
16. Cap Screw
17. Lock Nut
18. Nut
19. Washer
20. Spindle



733-341A

Fig. 7-70

KEY
1. Lower Arm
2. Bearing
3. Upper Arm
4. Bearing
5. Axle
6. Washer
7. Tube
8. Tube
9. Axle
10. Tube
11. Washer
12. Cap Screw
13. Insert
14. Cap Screw
15. Lock Nut
16. Cap Screw
17. Lock Nut
18. Lock Nut
19. Tube
20. Washer
21. Cap Screw



0735-030

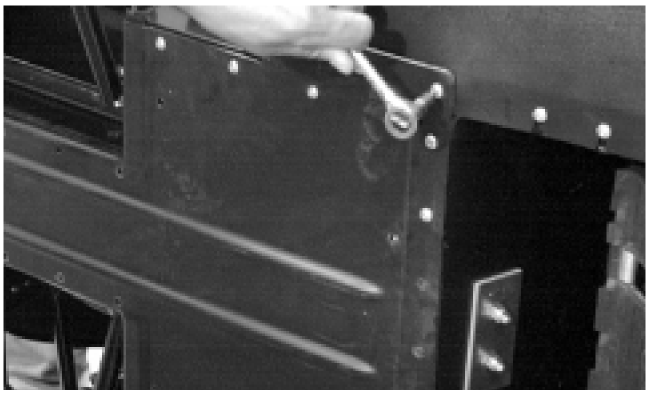
7

1. Place the suspension arms into position on the front end and secure with the cap screws and lock nuts. Tighten the upper arm cap screw and lock nut to 4.6 kg-m (33 ft-lb). Tighten the lower arm cap screw and lock nut to 7.6 kg-m (55 ft-lb).

2. If applicable, place the steering boot into position on the front end. Secure with the self-tapping screws.

3. Install the skid plate and secure with the screws, washer, and lock nut.

Fig. 7-71



AL144D

4. If applicable, place the sway bar link into position on the suspension arm and secure with cap screw and lock nut.

5. Accounting for mounting hardware, install the spindle onto the suspension arm with the cap screws and lock washers.

Fig. 7-72



AL160D

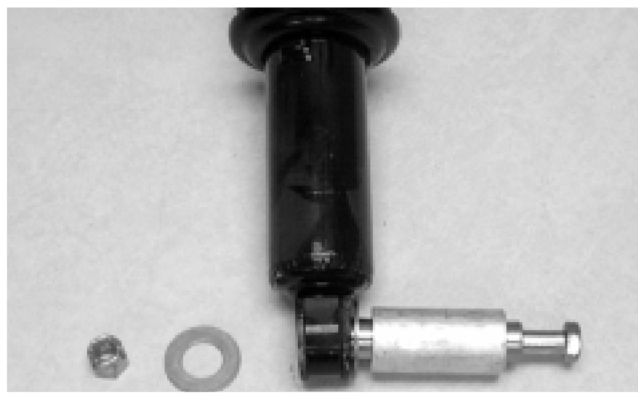
Fig. 7-73



AL159D

6. Place the shock absorber into position and secure to the front end and spindle with two cap screws, washers, axles, spacers, sleeves, and lock nuts. Tighten to 3.9 kg-m (28 ft-lb).

Fig. 7-74



AL157D

Fig. 7-75



AL156D

7. Install and secure the expansion chamber if removed.

Front Suspension (Ski) Shock Absorber

REMOVING

1. Position the front of the snowmobile up onto a safety stand taking all pressure off the skis.

2. Remove the cap screws securing the shock absorber to the front end assembly and spindle; then remove the shock absorber. Account for all mounting hardware.

Fig. 7-76



AL156D

■ **NOTE: Note the number of threads exposed between the spring adjuster and shock housing for installing purposes.**

3. Using the Shock Spring Removal Tool (p/n 0644-057), remove the spring from the shock body by compressing the spring; then remove the spring retainer from the top of the spring. Inspect the shock absorber by quickly compressing and extending the shock plunger while firmly holding the shock body. Resistance must be felt in both directions.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the shock absorber seal area for signs of excessive oil leakage.

2. Inspect the shock absorber mounting eyelet, bushings, and sleeve for wear or damage.

3. Inspect the threaded shock sleeve for damage or wear. Clean the sleeve and apply a light coat of grease to the threads before installing.

INSTALLING

1. Using the shock spring tool, place the spring on the shock absorber and secure with the retainer.

2. Adjust the retainer nut (spring adjuster) until the specified amount of threads are exposed between the spring adjuster and the shock housing (noted in removing) as an initial setting.

3. Install the bushings, sleeves, and spacers into each shock end; then place the shock absorber into position. Install both cap screws from the front. Tighten the lock nuts to 3.9 kg-m (28 ft-lb).

Fig. 7-77



AL156D

Sway Bar

REMOVING

1. Remove the lock nuts and cap screws securing the sway bar arm to the links and remove.

2. Remove the lock nuts and cap screws securing the sway bar arms to the sway bar; then remove the arms. Pull the sway bar out and account for two bearings.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the sway bar for any signs of twisting, fatigue, or wear.

2. Inspect the sway bar arms for cracks or damage.

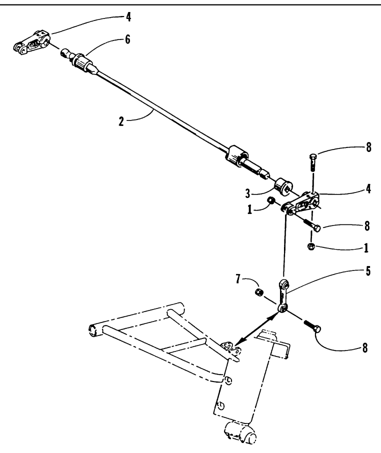
3. Inspect the links, bushings, bushing retainers, and hardware for damage or wear.

7

INSTALLING

Fig. 7-78

KEY
1. Lock Nut
2. Sway Bar
3. Bearing
4. Sway Bar Arm
5. Link
6. Bearing
7. Lock Nut
8. Cap Screw



733-342B

1. Place the sway bar into position; then install a bearing on each end of the sway bar.

2. Slide the sway bar arms onto the sway bar until the holes in the arms align with the notches in the sway bar. Install the cap screws and lock nuts. Tighten to 1.8 kg-m (13 ft-lb).

■ **NOTE: Make sure the arms are positioned on the same flat on both ends of the sway bar.**

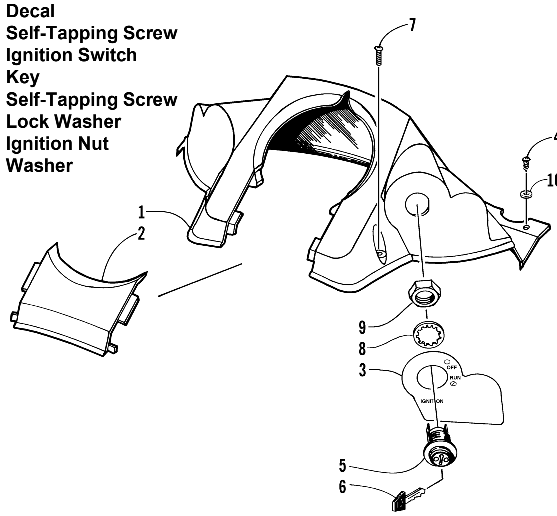
3. Place the links into position on the sway bar arms; then secure with cap screws and lock nuts. Tighten to 3.2 kg-m (23 ft-lb).

Console
(EFI Models)

■ **NOTE: Determine which style console is being removed and installed and refer to the appropriate illustration for component details; then remove and install accordingly.**

Fig. 7-79

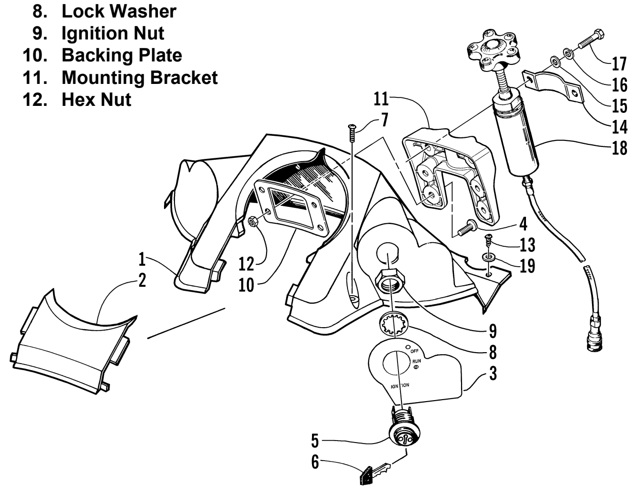
KEY
1. Console
2. Door
3. Decal
4. Self-Tapping Screw
5. Ignition Switch
6. Key
7. Self-Tapping Screw
8. Lock Washer
9. Ignition Nut
10. Washer



0734-301

Fig. 7-80

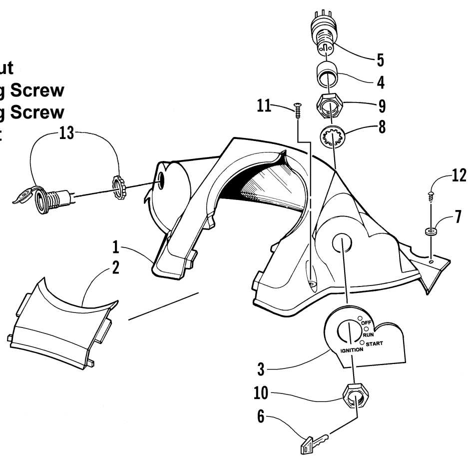
KEY
1. Console
2. Door
3. Decal
4. Machine Screw
5. Ignition Switch
6. Key
7. Self-Tapping Screw
8. Lock Washer
9. Ignition Nut
10. Backing Plate
11. Mounting Bracket
12. Hex Nut
13. Self-Tapping Screw
14. Retainer Bracket
15. Washer
16. Lock Washer
17. Cap Screw
18. Reservoir Assy
19. Washer



0734-309

Fig. 7-81

KEY
1. Console
2. Door
3. Decal
4. Spacer
5. Ignition Switch
6. Key
7. Washer
8. Washer
9. Ignition Nut
10. Retaining Nut
11. Self-Tapping Screw
12. Self-Tapping Screw
13. Outlet w/Nut



0735-111

REMOVING

1. Remove the self-tapping screws securing the console; then raise the console.

■ **NOTE: If applicable, remove the cap screws and washers securing the remote adjuster clamp to the console; then lay the adjuster on the air-intake silencer.**

2. Disconnect the wiring harness from the ignition switch.
3. Remove the console.

INSTALLING

1. Place the console into position.
2. Connect the wiring harness to the ignition switch.
3. Secure the console with the self-tapping screws.

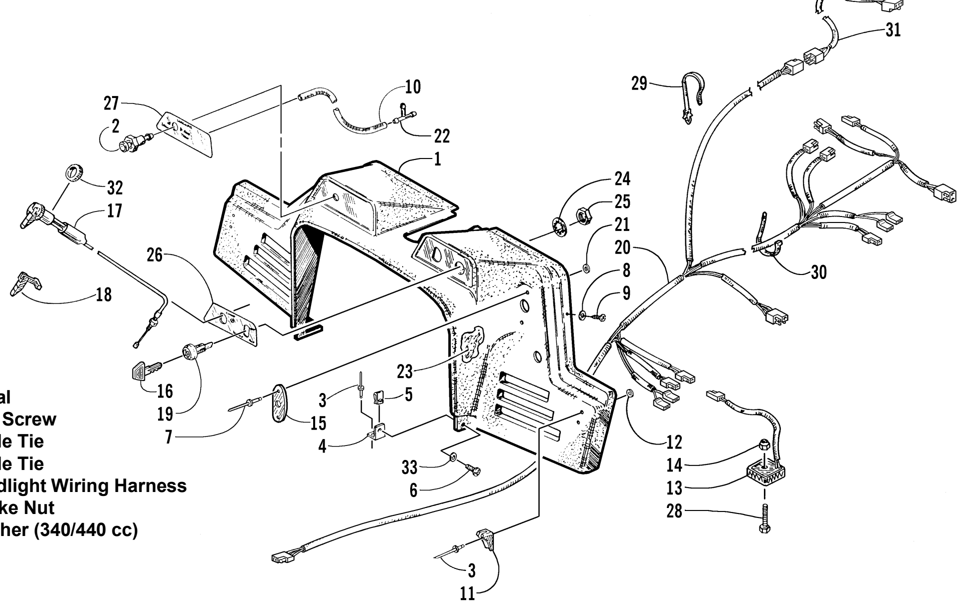
■ **NOTE: If applicable, place the remote adjuster and clamp into position on the console; then secure with the cap screws and washers. Tighten securely.**

Console
(Carbureted Models - Style A)

Fig. 7-82

KEY
1. Console
2. Primer (340/440 cc)
3. Rivet
4. Bracket
5. Speed Nut
6. Machine Screw
7. Rivet
8. Washer
9. Self-Tapping Screw
10. Hose (340/440 cc)
11. Latch Cup
12. Washer
13. Voltage Regulator
14. Lock Nut
15. Plate
16. Key
17. Choke Cable
18. Choke Lever Kit
19. Ignition Switch
20. Main Wiring Harness
21. Washer
22. T-Fitting (340/440 cc)
23. Foam
24. Ignition Washer
25. Ignition Nut
26. Decal
27. Decal
28. Cap Screw
29. Cable Tie
30. Cable Tie
31. Headlight Wiring Harness
32. Choke Nut
33. Washer (340/440 cc)

***Not Illustrated - 12-Volt Receptacle (550 cc)**
***Not Illustrated - Posistor (550 cc)**



0734-590

REMOVING

1. Pull the recoil starter rope outward; then tie a slip-knot in the recoil rope near the case. Slowly allow the rope to retract to the knot.

2. Untie the knot in the end of the recoil starter rope; then remove the handle from the rope. Account for the cap.

3. Remove the cotter pin and pin securing the shift lever to the shift pivot; then pull the shift lever out of the console.

4. Remove the four screws securing the steering post cover; then remove the steering post cover.

Fig. 7-83



AF906D

5. Remove the screws securing the console; then raise the console.

6. Disconnect the wiring harness from the ignition switch. Remove the knurled nut securing the choke assembly to the console; then slide the choke cable out of the console.

7. If applicable, remove the primer; then remove the console.

INSTALLING

1. Place the console into position; then (if applicable) install the primer.

2. Connect the wiring harness to the ignition switch. Secure the choke assembly to the console with the knurled nut.

3. Secure the console with screws.

4. Secure the steering post cover with four screws.

5. Slide the shift lever into the hole in the console; then secure the shift lever to the shift pivot with the pin and cotter pin.

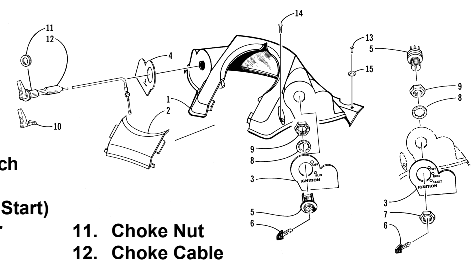
6. Thread the recoil starter rope through the console and handle. Tie a knot at the end of the recoil rope. Seat the cap. Remove the slip-knot and allow the rope to retract.

Console
(Carbureted Models - Style B)

■ **NOTE: Determine which type of console is being removed and installed and refer to the appropriate illustration for component details; then remove and install accordingly.**

Fig. 7-84

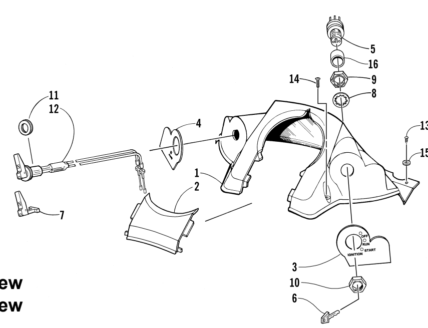
KEY
1. Console
2. Door
3. Decal
4. Decal
5. Ignition Switch
6. Key
7. Nut (Electric Start)
8. Lock Washer
9. Nut
10. Choke Lever Kit
11. Choke Nut
12. Choke Cable
13. Self-Tapping Screw
14. Self-Tapping Screw
15. Washer



0735-003

Fig. 7-85

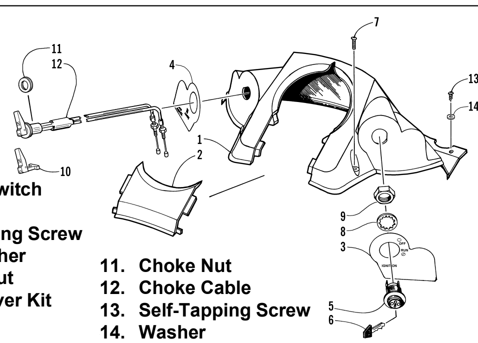
KEY
1. Console
2. Door
3. Decal
4. Decal
5. Ignition Switch
6. Key
7. Choke Lever Kit
8. Lock Washer
9. Nut
10. Nut
11. Choke Nut
12. Choke Cable
13. Self-Tapping Screw
14. Self-Tapping Screw
15. Washer
16. Spacer



0735-021

Fig. 7-86

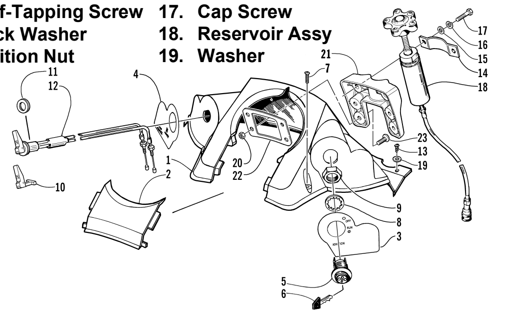
KEY
1. Console
2. Door
3. Decal
4. Decal
5. Ignition Switch
6. Key
7. Self-Tapping Screw
8. Lock Washer
9. Ignition Nut
10. Choke Lever Kit
11. Choke Nut
12. Choke Cable
13. Self-Tapping Screw
14. Washer



0733-357

Fig. 7-87

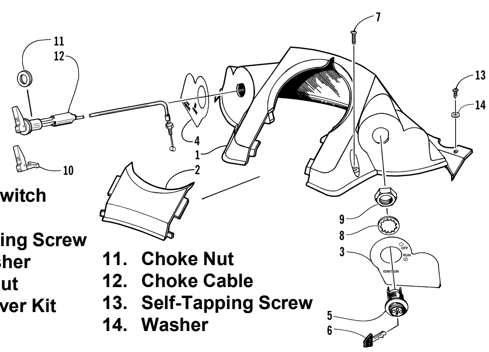
KEY
1. Console
2. Door
3. Decal
4. Decal
5. Ignition Switch
6. Key
7. Self-Tapping Screw
8. Lock Washer
9. Ignition Nut
10. Choke Lever Kit
11. Choke Nut
12. Choke Cable
13. Self-Tapping Screw
14. Retainer Bracket
15. Washer
16. Lock Washer
17. Cap Screw
18. Reservoir Assy
19. Washer
20. Hex Nut
21. Mounting Bracket
22. Backing Plate
23. Machine Screw



0734-194

Fig. 7-88

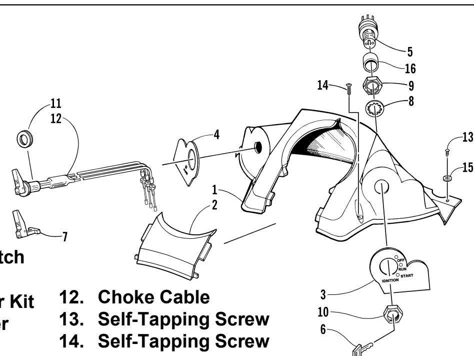
KEY
1. Console
2. Door
3. Decal
4. Decal
5. Ignition Switch
6. Key
7. Self-Tapping Screw
8. Lock Washer
9. Ignition Nut
10. Choke Lever Kit
11. Choke Nut
12. Choke Cable
13. Self-Tapping Screw
14. Washer



0734-242

Fig. 7-89

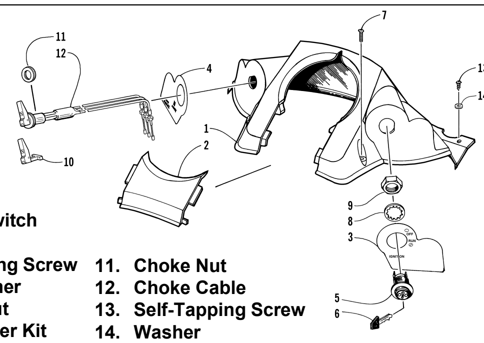
KEY
1. Console
2. Door
3. Decal
4. Decal
5. Ignition Switch
6. Key
7. Choke Lever Kit
8. Lock Washer
9. Ignition Nut
10. Retaining Nut
11. Choke Nut
12. Choke Cable
13. Self-Tapping Screw
14. Self-Tapping Screw
15. Washer
16. Spacer



0735-155

Fig. 7-90

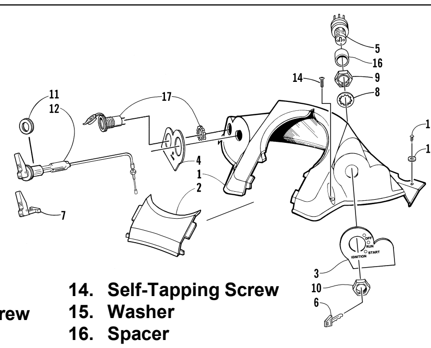
KEY
1. Console
2. Door
3. Decal
4. Decal
5. Ignition Switch
6. Key
7. Self-Tapping Screw
8. Lock Washer
9. Ignition Nut
10. Choke Lever Kit
11. Choke Nut
12. Choke Cable
13. Self-Tapping Screw
14. Washer



0734-288

Fig. 7-91

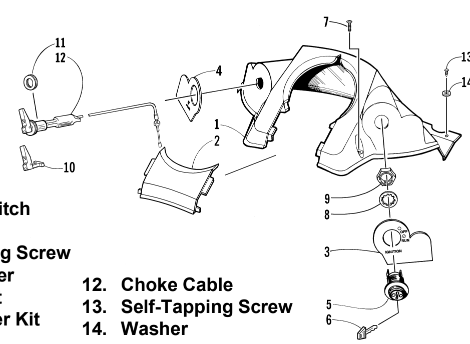
KEY
1. Console
2. Door
3. Decal
4. Decal
5. Ignition Switch
6. Key
7. Choke Lever Kit
8. Lock Washer
9. Ignition Nut
10. Retaining Nut
11. Choke Nut
12. Choke Cable
13. Self-Tapping Screw
14. Self-Tapping Screw
15. Washer
16. Spacer
17. Outlet w/Nut



0735-283

Fig. 7-92

KEY
1. Console
2. Door
3. Decal
4. Decal
5. Ignition Switch
6. Key
7. Self-Tapping Screw
8. Lock Washer
9. Ignition Nut
10. Choke Lever Kit
11. Choke Nut
12. Choke Cable
13. Self-Tapping Screw
14. Washer



0734-562

REMOVING

1. Remove the self-tapping screws securing the console; then raise the console.

■ NOTE: If applicable, remove the cap screws and washers securing the remote adjuster clamp to the console; then lay the adjuster on the air-intake silencer.

2. Disconnect the wiring harness from the ignition switch and the outlet (if applicable). Remove the choke nut securing the choke assembly to the console; then slide the choke cable out of the console.

3. Remove the console.

INSTALLING

1. Place the console into position.

2. Connect the wiring harness to the ignition switch and the outlet (if applicable). Secure the choke assembly to the console with the choke nut.

3. Secure the console with the self-tapping screws.

■ **NOTE: If applicable, place the remote adjuster and clamp into position on the console; then secure with the cap screws and washers. Tighten securely.**

Taillight Housing

REMOVING

1. Remove the four screws securing the taillight lens to the housing. Account for a gasket.

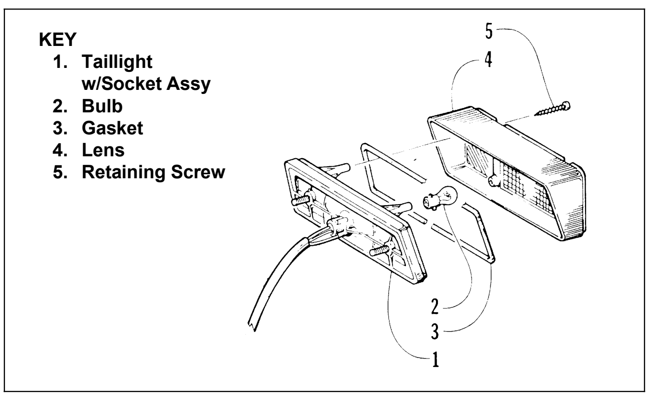
2. Remove the four machine screws securing the backing plate to the taillight housing.

3. Remove the two screws, lock washers, and washers securing the seat base to the tunnel. Lift the seat from the tunnel. Disconnect the taillight wiring harness.

4. Remove the two lock nuts and washers securing the taillight housing to the rear of the seat base. Pull the housing free of the base.

INSTALLING

Fig. 7-93



728-384B

1. Connect the wiring harness and place the seat into position. Secure with two screws, lock nuts, and washers.

2. Place the taillight housing into position and secure to the seat base with two lock nuts and washers. Tighten securely.

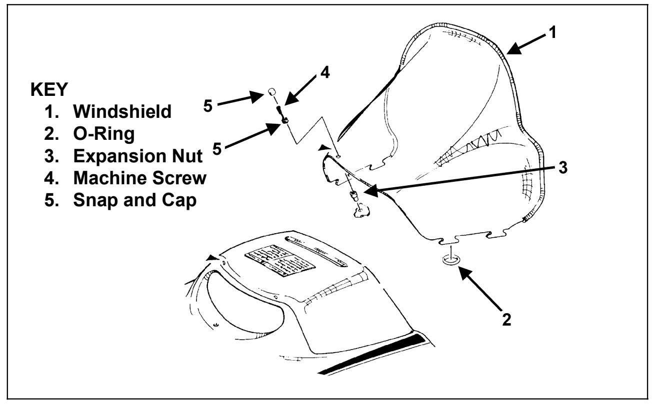
3. Install the taillight bulb, gasket, and lens. Secure lens with four screws.

4. Secure the backing plate to the taillight housing with the existing machine screws.

Windshield

REMOVING

Fig. 7-94



731-745A

1. Remove the O-rings securing windshield to the hood.

2. Remove the caps covering the screws; then remove the screws w/snaps.

3. Remove the windshield.

INSTALLING

1. Place the windshield into position and install the O-rings.

2. Secure the windshield to the hood with screws w/snaps. Install the caps.

Backrest/Rack/Taillight Assembly

REMOVING

1. Remove the cap screws, washers, and cap nuts securing the rack to the backrest.

2. In turn on each side, remove the two cap screws (inside the tunnel) securing the backrest assembly to the tunnel. Account for the washers.

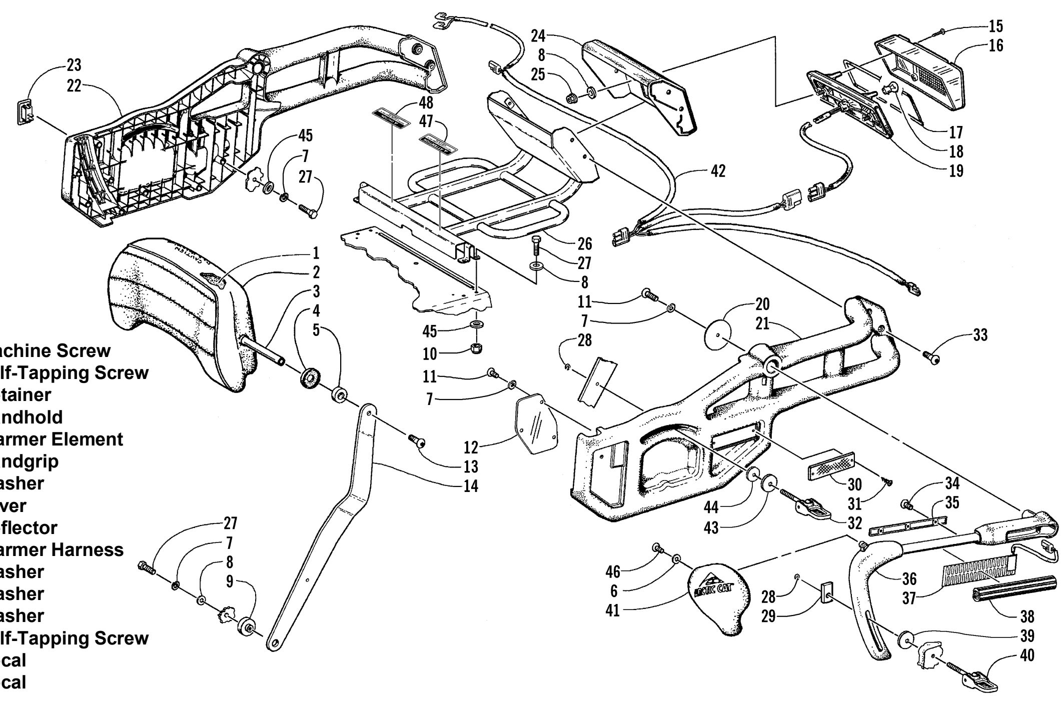
3. Disconnect the passenger handwarmer wiring harness.

4. Remove the backrest assembly from the tunnel. Account for the two spacers.

INSTALLING

Fig. 7-95

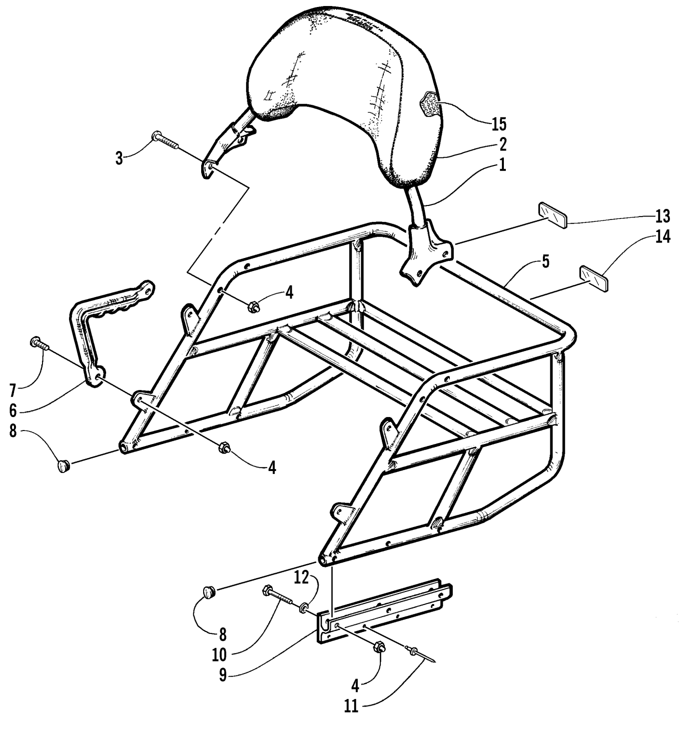
KEY
1. Backrest
2. Cover
3. Axle
4. Cup Washer
5. Tension Block
6. Washer
7. Lock Washer
8. Washer
9. Spacer
10. Lock Nut
11. Machine Screw
12. Retainer
13. Machine Screw
14. Adjuster Arm
15. Retaining Screw
16. Lens
17. Gasket
18. Bulb
19. Housing
20. Retainer
21. Bracket
22. Bracket
23. Switch
24. Cover
25. Nut w/Washer
26. Bracket
27. Cap Screw
28. E-Ring
29. T-Nut
30. Reflector
31. Clip
32. Lever
33. Machine Screw
34. Self-Tapping Screw
35. Retainer
36. Handhold
37. Warmer Element
38. Handgrip
39. Washer
40. Lever
41. Deflector
42. Warmer Harness
43. Washer
44. Washer
45. Washer
46. Self-Tapping Screw
47. Decal
48. Decal



0735-101

Fig. 7-96

KEY
1. Backrest
2. Cover
3. Machine Screw
4. Cap Nut
5. Rack
6. Handgrip
7. Machine Screw
8. Closure Tube
9. Bracket
10. Cap Screw
11. Rivet
12. Washer
13. Decal
14. Decal
15. Foam



0733-368

1. Place the backrest assembly and spacers (located on the rear hole on each side) into position and align holes with tunnel mounting holes.

2. Install the cap screws with washers from the inside of the tunnel and secure with the washers and lock nuts. Tighten securely.

3. In turn on each side, install the 1/4-in. cap screw in the front hole and the 5/16-in. cap screw in the rear hole. Secure with a flat washer and lock nut. Tighten securely.

4. Connect the passenger handwarmer wiring harness.

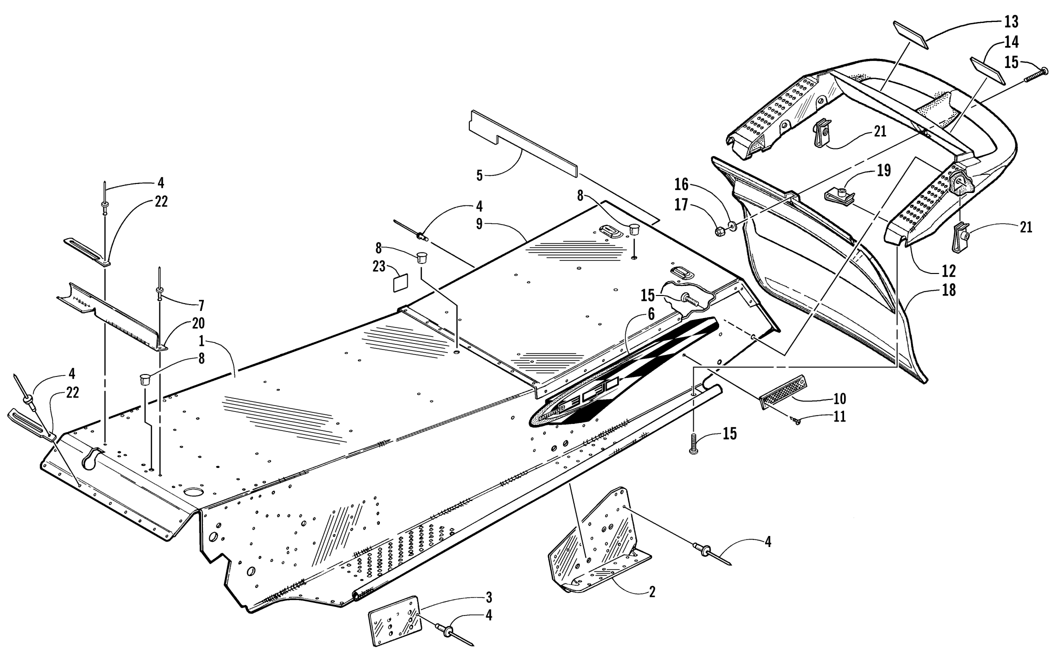
5. Place the rack into position and secure with the cap screws, washers, and cap nuts.

Tunnel/Rear Bumper/ Snowflap

■ **NOTE: Determine which style tunnel assembly is being disassembled and refer to the appropriate illustration for component details; then disassemble and assemble accordingly.**

Fig. 7-97

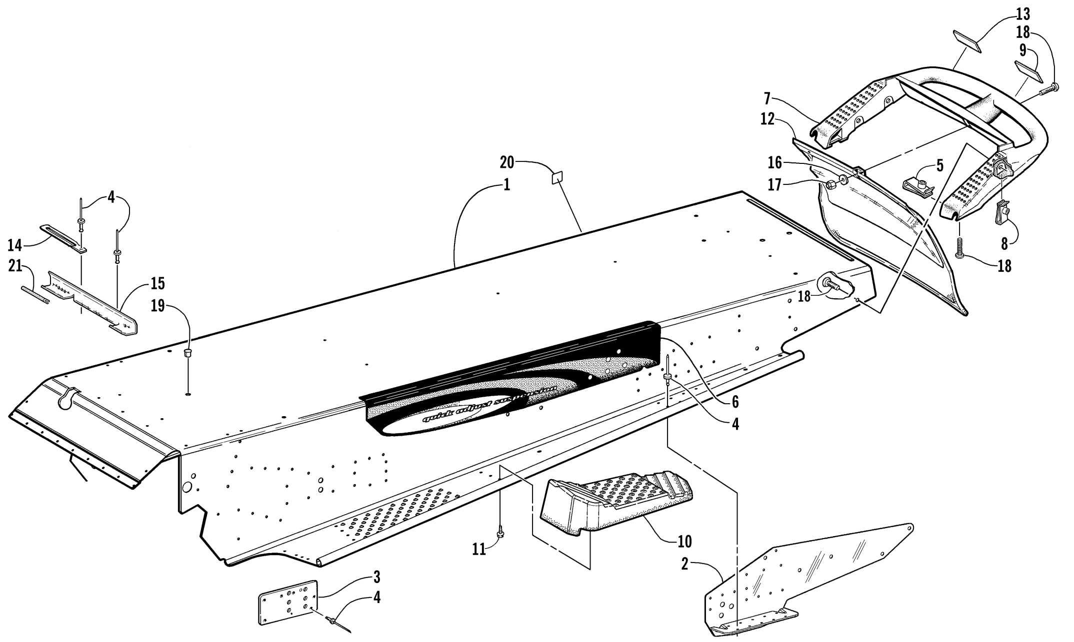
KEY
1. Tunnel Assy
2. Bracket
3. Mounting Plate
4. Rivet
5. Decal
6. Decal
7. Rivet
8. Plug
9. End Plate
10. Reflector
11. Retaining Clip
12. Bumper
13. Decal
14. Decal
15. Machine Screw
16. Washer
17. Lock Nut
18. Snowflap
19. U-Nut
20. Bracket
21. U-Nut
22. Clamp
23. Decal



0735-344

Fig. 7-98

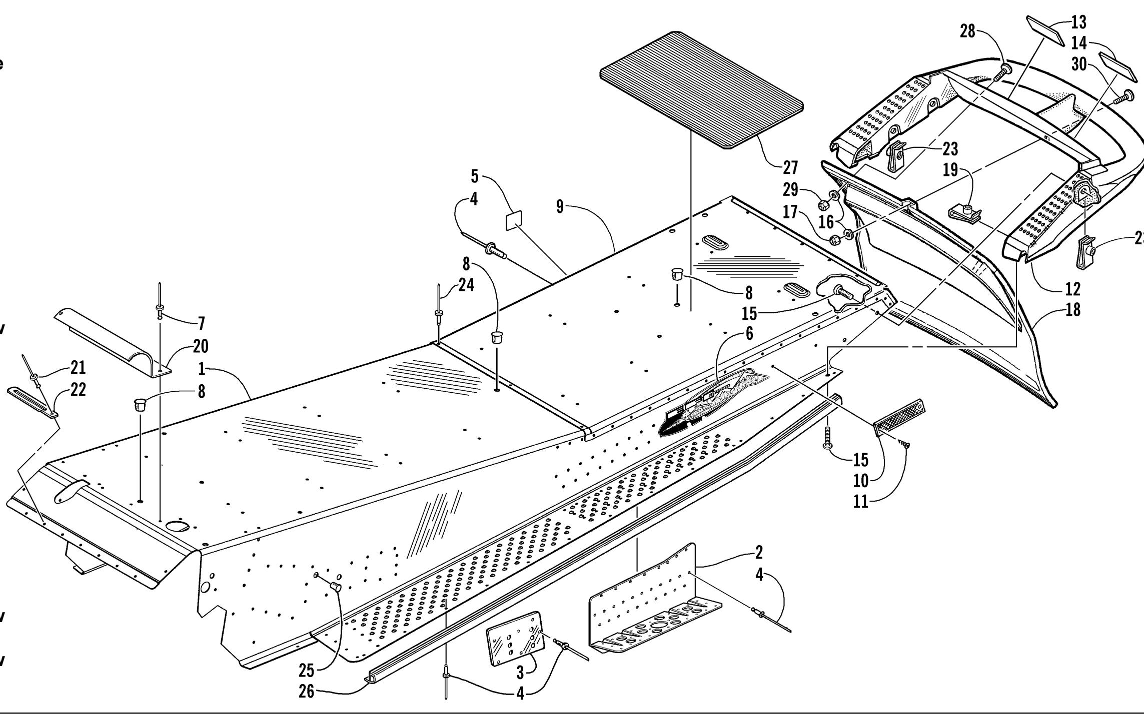
KEY
1. Tunnel Assy
2. Bracket
3. Mounting Plate
4. Rivet
5. U-Nut
6. Decal
7. Rear Bumper
8. U-Nut
9. Decal
10. Footrest
11. Self-Tapping Screw
12. Snowflap
13. Decal
14. Clamp
15. Bracket
16. Washer
17. Lock Nut
18. Machine Screw
19. Plug
20. Decal
21. Trim



0735-091

Fig. 7-99

KEY
1. Tunnel Assy
2. Bracket
3. Mounting Plate
4. Rivet
5. Decal
6. Decal
7. Rivet
8. Plug
9. End Plate
10. Reflector
11. Retaining Clip
12. Bumper
13. Decal
14. Decal
15. Machine Screw
16. Washer
17. Lock Nut
18. Snowflap
19. U-Nut
20. Bracket
21. Rivet
22. Clamp
23. U-Nut
24. Rivet
25. Plug
26. Roll
27. Pad
28. Machine Screw
29. Lock Nut
30. Machine Screw

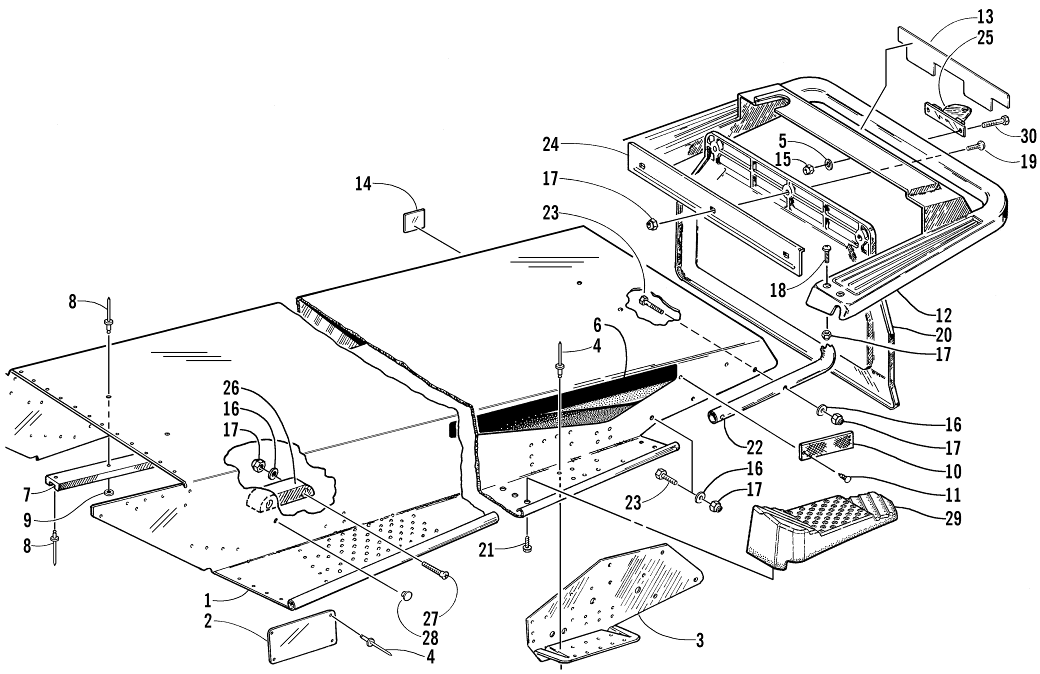


0735-217

7

Fig. 7-100

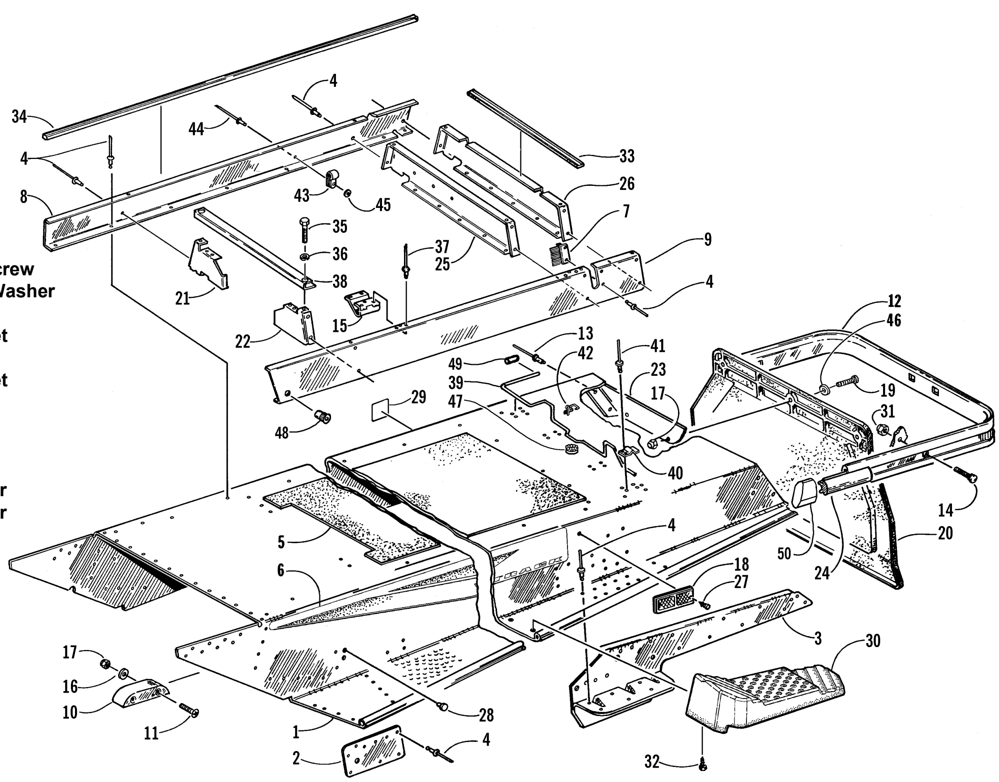
KEY
1. Tunnel Assy
2. Mounting Plate
3. Bracket
4. Rivet
5. Washer
6. Decal
7. Wear Strip
8. Rivet
9. Washer
10. Reflector
11. Clip
12. Bumper
13. Decal
14. Decal
15. Lock Nut
16. Washer
17. Lock Nut
18. Machine Screw
19. Machine Screw
20. Snowflap
21. Self-Tapping Screw
22. Insert
23. Cap Screw
24. Cap
25. Hitch
26. Guide
27. Cap Screw
28. Plug
29. Footrest
30. Cap Screw



0734-916

Fig. 7-101

KEY
1. Tunnel Assy
2. Mounting Plate
3. Bracket
4. Rivet
5. Pad
6. Decal
7. Seal
8. Plate
9. Plate
10. Guide
11. Machine Screw
12. Bumper
13. Rivet
14. Carriage Bolt
15. Hinge
16. Washer
17. Lock Nut
18. Reflector
19. Machine Screw
20. Snowflap
21. Plate
22. Plate
23. Plate
24. Insert
25. Plate
26. Plate
27. Clip
28. Plug
29. Decal
30. Footrest
31. Lock Nut
32. Self-Tapping Screw
33. Self-Tapping Screw
34. Seal
35. Cap Screw
36. Lock Washer
37. Rivet
38. Bracket
39. Lever
40. Bracket
41. Rivet
42. Spring
43. Clamp
44. Rivet
45. Washer
46. Washer
47. Disc
48. Insert
49. Cap
50. Cap



0734-952

REMOVING/DISASSEMBLING

■ **NOTE: The snowflap can be removed without removing the bumper by removing the three bumper/snowflap cap screws.**

1. Remove the cap screws securing the bumper assembly to the tunnel. Account for the U-nuts and cap screws.
2. Slide the bumper/snowflap off the tunnel.
3. Remove the cap screws securing the snowflap to the bumper and separate the bumper and snowflap. Account for cap screws, washers, and lock nuts.

ASSEMBLING/INSTALLING

1. Secure the snowflap to the bumper with the cap screws, washers, and lock washers taking care to place the washers next to the underside of the snowflap. Finger-tighten the cap screws to the lock nuts; then tighten the cap screws securely.
2. Place the bumper assembly into position on the tunnel and secure with the cap screws and U-nuts. Tighten the cap screws securely.

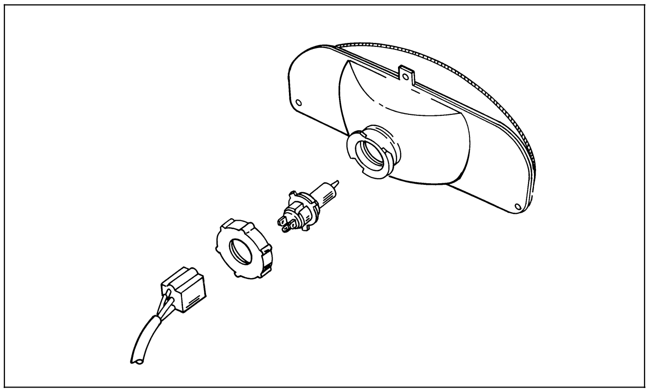
Headlight Assembly
(1 Bulb Halogen)

REMOVING

■ **NOTE: The bulb portion of the headlight is fragile. HANDLE WITH CARE. When replacing the headlight bulb, the bulb assembly must first be removed from the housing. Do not touch the glass portion of the bulb. If the glass is touched, it must be cleaned with a dry cloth before installing.**

1. To release the retaining ring, depress the ring and rotate it counterclockwise. Slide the retaining ring down the wiring harness.
2. With the harness connector attached to the bulb, carefully withdraw the bulb from the headlight housing.
3. Grasp the bulb by the metal base and carefully remove the headlight harness from the bulb.
4. Between the top center of the headlight and hood, there is a reusable plastic push rivet. From the front using a medium-sized standard screwdriver, push the center post of the rivet back.

Fig. 7-102



0731-844

5. Remove the headlight adjustment thumb screws; then remove the headlight assembly.

■ **NOTE: Halogen bulbs must not come in contact with hands or foreign contaminants.**

INSTALLING

1. Place the headlight assembly into position. Secure with a push rivet and two adjustment thumb screws.
2. While holding bulb by the base, firmly install the bulb in the harness connector.
3. Install bulb assembly (with harness attached) into headlight housing. Make sure the bulb is firmly seated in the headlight housing.
4. Install the retaining ring onto the back of the headlight. Depress the ring and rotate it clockwise to lock in place.

Fig. 7-103



AL084D

5. Check headlight aim (see Adjusting Headlight Aim in this section).

⚠ WARNING

Do not operate the snowmobile unless headlight beam is adjusted properly. An incorrectly adjusted beam will not provide the operator the optimum amount of light.

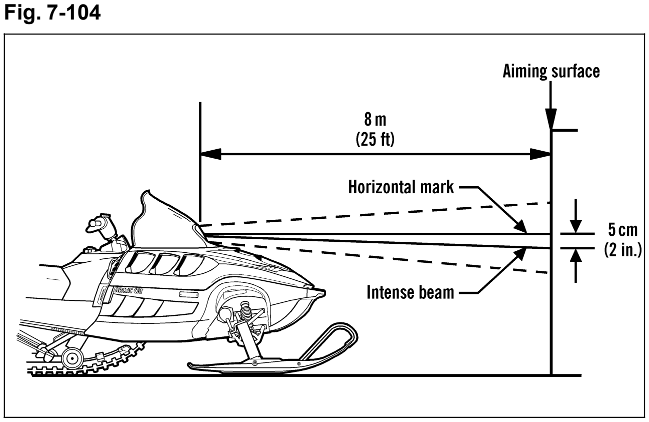
7

Adjusting Headlight Aim (1 Bulb Halogen)

The headlight HIGH/LOW beam can be adjusted vertically and horizontally. The geometric center of the HIGH beam light zone is to be used for vertical and horizontal aiming.

1. Position the snowmobile on a level floor so the headlight is approximately 8 m (25 ft) from an aiming surface (wall or similar surface).
2. Measure the distance from the floor to the midpoint of the headlight.
3. Using the measurement obtained in step 2, make a horizontal mark on the aiming surface.
4. Make a vertical mark which intersects the horizontal mark on the aiming surface directly in front of the headlight.
5. Start the engine. Move the headlight dimmer switch to the HIGH beam position. DO NOT USE THE LOW BEAM.
6. Observe the headlight beam aim. Proper aim is when the most intense beam is centered on the vertical mark 5 cm (2 in.) below the horizontal mark on the aiming surface.

Fig. 7-104



0734-485

7. Rotate the adjustment thumb screws until the correct aim is obtained.

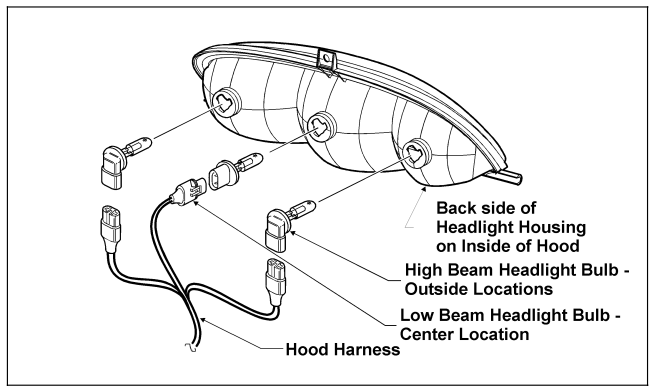
Headlight Assembly (3 Bulb Halogen)

REMOVING HEADLIGHT BULB

■ **NOTE: The bulb portion of the headlight is fragile. HANDLE WITH CARE. When replacing the headlight bulb, the bulb assembly must first be removed from the housing. Do not touch the glass portion of the bulb. If the glass is touched, it must be cleaned with a dry cloth before installing.**

1. Pull the wiring harness retaining clip away from the headlight bulb base and disconnect the wiring harness from the bulb.

Fig. 7-105



0733-178

2. Rotate the headlight bulb base counterclockwise and remove the bulb from the headlight housing.

INSTALLING HEADLIGHT BULB

⚠ CAUTION

Do not touch the glass portion of the bulb. If the glass portion is touched, it must be cleaned with a dry cloth before installing.

1. While holding the bulb by its base, insert the bulb into the headlight housing and rotate it clockwise until it locks into the housing.
2. Plug the wiring harness into the headlight bulb base making sure the retaining clip locks onto the base.
3. Check headlight aim (see Adjusting Headlight Aim in this section).

⚠ WARNING

Do not operate the snowmobile unless headlight beam is adjusted properly. An incorrectly adjusted beam will not provide the operator the optimum amount of light.

Adjusting Headlight Aim (3 Bulb Halogen)

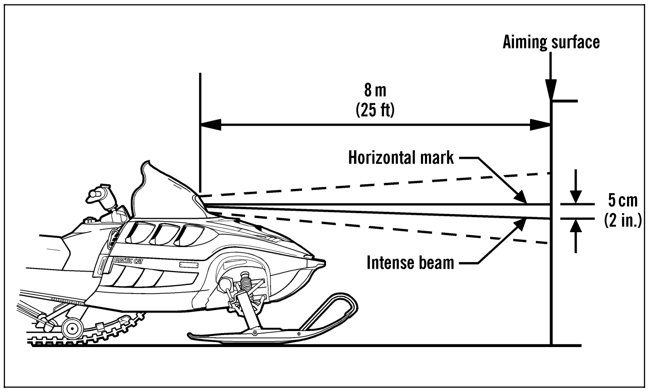
The headlight can be adjusted for vertical aim of the HIGH/LOW beam. The geometric center of HIGH beam zone is to be used for vertical aiming.

1. Position the snowmobile on a level floor so the headlight is approximately 8 m (25 ft) from an aiming surface (wall or similar surface).

■ **NOTE: There should be an "average" operating load on the snowmobile when adjusting headlight aim.**

2. Measure the distance from the floor to midpoint of the headlight.
3. Using the measurement obtained in step 2, make a horizontal mark on the aiming surface.
4. Make a vertical mark which intersects the horizontal mark on the aiming surface directly in front of the headlight.
5. Engage the brake lever lock and start the engine. Move the headlight dimmer switch to the HIGH beam position. DO NOT USE LOW BEAM.
6. Observe the headlight beam aim. Proper aim is when the most intense beam is centered on the vertical mark 5 cm (2 in.) below the horizontal mark on the aiming surface.

Fig. 7-106



0734-485

7. Adjust the headlight housing mounting screws until correct aim is obtained. Shut the engine off; then disengage the brake lever lock.

Torque Specifications

CHASSIS		TORQUE
Ski	ft-lb kg-m	45 6.2
Handlebar Adjuster Block	ft-lb kg-m	10 1.4
Steering Post Bearing Housings	ft-lb kg-m	18 2.5
Steering Post/Tie Rod	ft-lb kg-m	30 4.2
Drag Link/Tie Rods	ft-lb kg-m	20 2.8
Drag Link/Steering-Idler Arms	ft-lb kg-m	30 4.2
Spindle Arm/Tie Rod	ft-lb kg-m	25 3.5
Tie Rod Jam Nuts	ft-lb kg-m	12-15 1.7-2.1
Suspension Arms/Spindle	ft-lb kg-m	30 4.2
Shock Absorber/Spindle	ft-lb kg-m	28 3.9
Front Suspension A-Arm (upper)	ft-lb kg-m	33 4.6
Front Suspension A-Arm (lower)	ft-lb kg-m	55 7.6
Sway Bar Arm	ft-lb kg-m	13 1.8
Ball Joint/Sway Bar	ft-lb kg-m	23 3.2

SECTION 8 - DRIVE TRAIN AND BRAKE SYSTEMS

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8

Drive Belt

The belt dimensions and construction are two factors that influence the performance of the drive system. The two belt dimensions that are important to the performance of the snowmobile are the outside circumference and the width. Both of these dimensions will influence shifting characteristics.

If the drive belt is longer than specified, the drive clutch and driven pulley will not have the full shift ratio. Also, a too-long drive belt will cause poor acceleration and a decrease in top speed.

If the drive belt is shorter than specified, the drive clutch and driven pulley will have a different shift pattern because they are in different ratios from those for which they were originally matched. A too-short drive belt will cause a loss in performance and a bog on engagement.

■ **NOTE: A drive belt that is worn thin may produce the same effect as one that is too long.**

Drive belt construction has an influence on the way the drive clutch and driven pulley will shift and on the amount of power that will be transmitted through the system. ONLY ARCTIC CAT DRIVE BELTS SHOULD BE USED. Different brands of belts may not have the same construction causing either more friction or more slippage when the belt is wedged between the sheaves and, thus, a loss of efficiency.

■ **NOTE: A stiff belt causes a HP loss to the track. As a belt warms up, it gets more flexible and transmits power with less HP loss.**

Drive Clutch

CHANGING CAM ARMS

The cam arms on the drive clutch can be changed without disassembling the clutch. To change the cam arms, use the following procedure.

1. Check to make sure the ignition switch is in the OFF position.

2. Remove the drive belt.

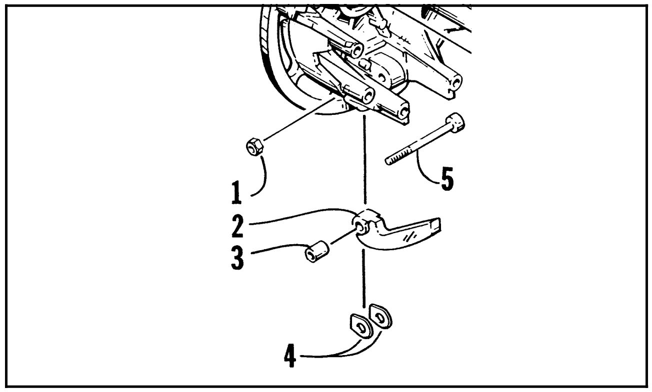
3. Compress the movable sheave approximately 2.5 cm (1 in.) and while holding it in this position, insert a flat bar firmly between the bottom side of the spider and the inner surface of the movable sheave. Slowly release the movable sheave.

4. Remove the lock nuts from the three cam arm pins.

5. Remove the cam arm pins one at a time; then remove the cam arm with bushing and account for the washers.

■ **NOTE: When installing cam arms, always use new lock nuts. Make sure the head of each cam arm pin is positioned towards the direction of drive clutch rotation. Tighten nuts until they contact the shoulder of the cam arm pin; then tighten an additional 1/8 turn.**

Fig. 8-1



733-452B

6. Change the cam arms and secure with new lock nuts and existing pins making sure the head of each pin is positioned toward the direction of drive clutch rotation.

■ **NOTE: The drive clutch rotates counterclockwise.**

⚠ WARNING

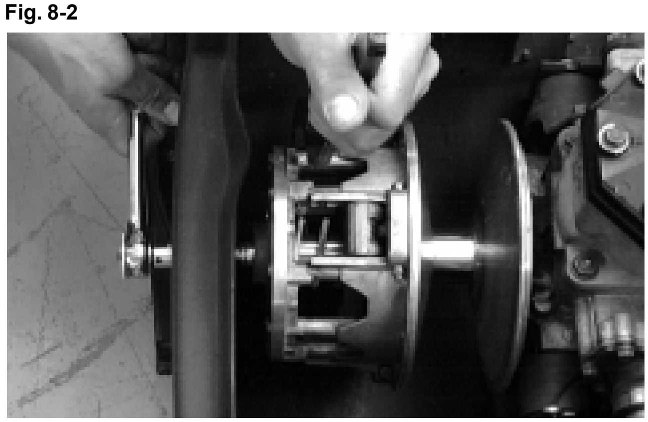
Do not run the engine with the drive belt removed or the bar in the clutch.

REMOVING

1. Open the belt guard; then remove the drive belt and the plug from the belly pan.

2. Remove the bolt and lock washer securing the drive clutch to the crankshaft.

Fig. 8-2

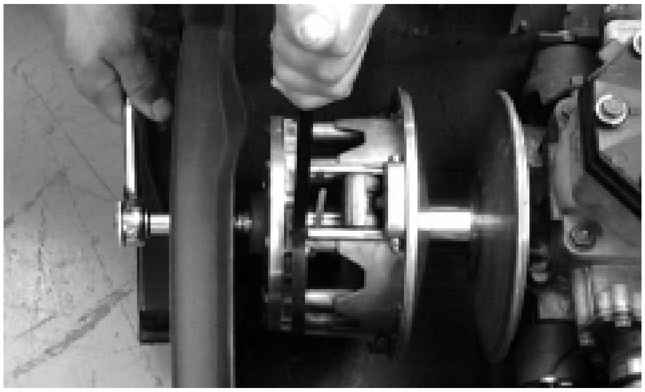


AN380D

■ **NOTE: Before installing the clutch puller, apply oil to the threads of the puller and a small amount of grease to the tip of the puller.**

3. Using the Clutch Puller (p/n 0644-207) and an impact wrench or a breaker bar and the Drive Clutch Spanner Wrench (p/n 0644-136), tighten the puller. If the drive clutch will not release, sharply strike the head of the puller. Repeat this step until the clutch releases.

Fig. 8-3



AN381D

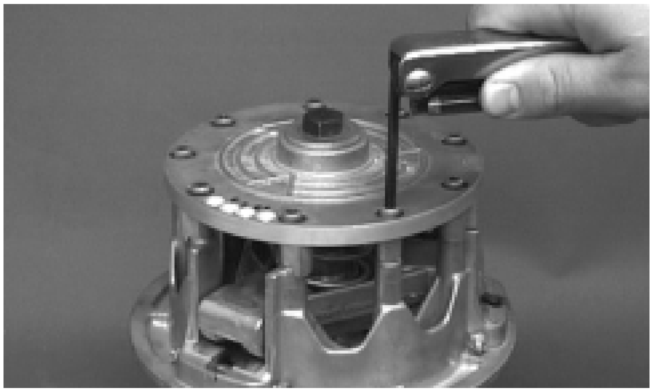
4. Remove the drive clutch from the engine compartment. Account for any spacers.

DISASSEMBLING

■ **NOTE: Note the timing marks on the cover, spider, and movable sheave. These must be aligned when assembling the drive clutch for balance purposes.**

1. Loosen the nine cap screws securing the cover plate. Remove every other cap screw and lock washer from the cover plate; then while firmly holding the cover plate, remove the four remaining cap screws and lock washers equally.

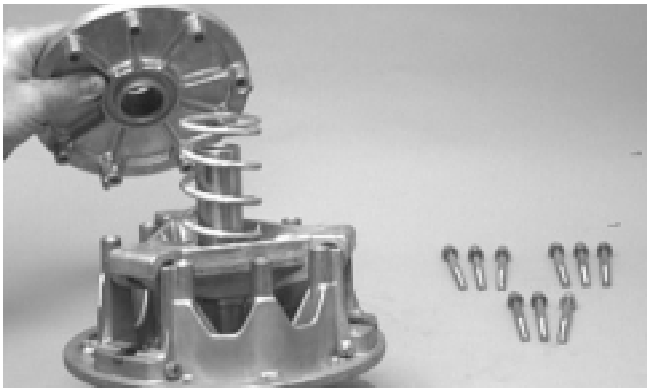
Fig. 8-4



AM059D

2. Remove the cover and spring.

Fig. 8-5

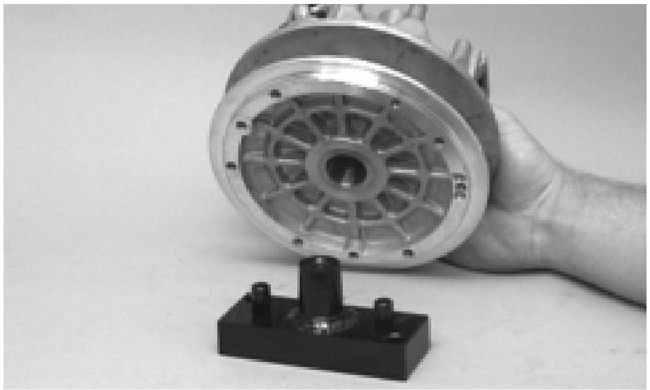


AM061D

3. Position the drive clutch over the Clutch Holder (p/n 0644-058).

■ **NOTE: The holder should either be secured in a vise or bolted to a sturdy work bench.**

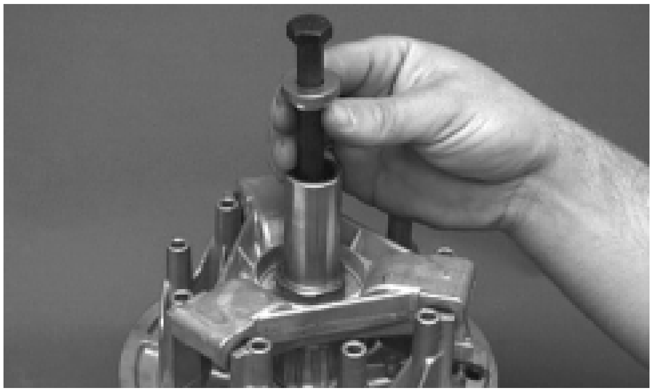
Fig. 8-6



AM063D

4. Secure the drive clutch to the holder using the clutch bolt and lock washer.

Fig. 8-7

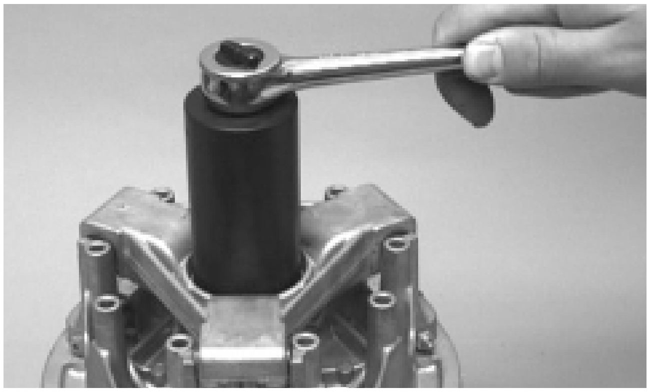


AM064D

5. Using the Thin Wall Deep Socket (p/n 0644-138), remove the spider retainer nut.

8

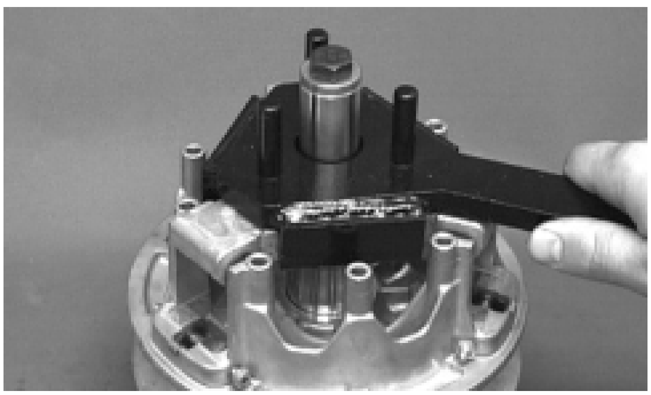
Fig. 8-8



AM065D

6. Using a small torch, heat the threaded area of the spider. Place the Spider Removal Tool (p/n 0644-085) over the heated spider and break spider loose by turning it counterclockwise.

Fig. 8-9



AM067D

■ **NOTE: Applying heat to the spider threaded area will aid in clutch disassembly. The heat will loosen the Loctite used during assembly.**

7. Remove the drive clutch from the clutch holder using the clutch puller and the same procedure as pulling the drive clutch from the crankshaft.

8. Remove the spider, spacer washers, and movable sheave.

9. Using a pair of pliers, remove the six spider buttons.

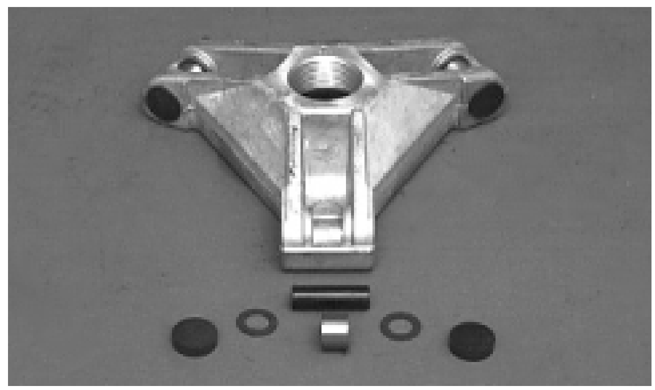
Fig. 8-10



AM070D

10. Using a punch, push each pin from the roller. Account for the roller washers (one on each side of each roller).

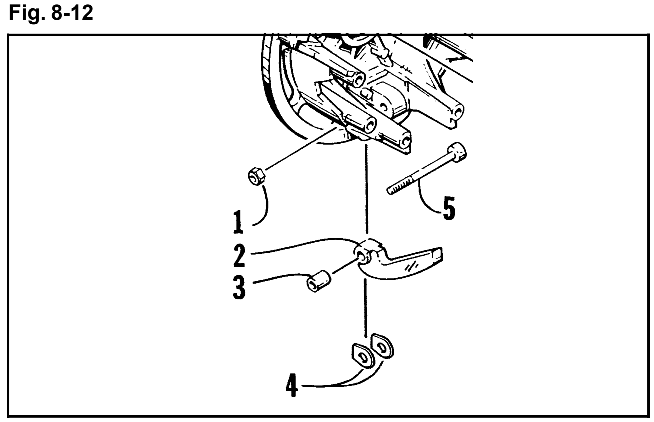
Fig. 8-11



AM071D

11. Remove the three cam arm pins and lock nuts securing the cam arms to the movable sheave; then remove each cam arm and account for the bushing and the washers.

Fig. 8-12



733-452B

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Using parts-cleaning solvent, wash grease, dirt, and foreign matter off all components; dry with compressed air.

2. Remove any drive belt dust accumulation from the stationary sheave, movable sheave, and bushings using parts-cleaning solvent only.

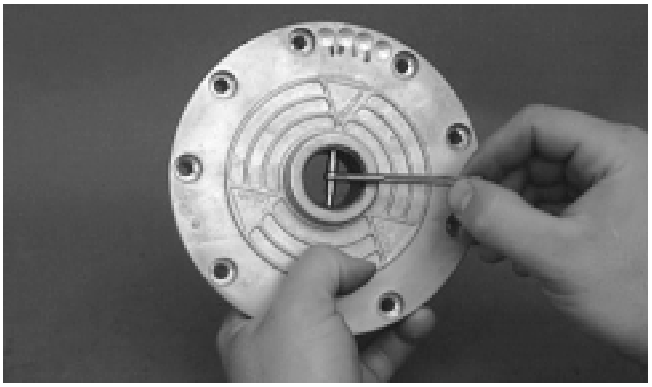
> ⚠ **CAUTION**
>
> **Do not use steel wool or a wire brush to clean components having a bushing; damage to the bushing will result.**

3. Inspect stationary sheave, movable sheave, spider, and cover for cracks or imperfections in the casting.

4. Inspect the cam arm pins for wear or bends.

5. Inspect the bushing in the cover for wear, damage, or cracks. Measure the inside diameter of the bushing and the outside diameter of the stationary sheave hub. The difference (clearance) must be less than 0.20 mm (0.008 in.). If cover bushing is not within specifications, replace the cover.

Fig. 8-13



AM078D

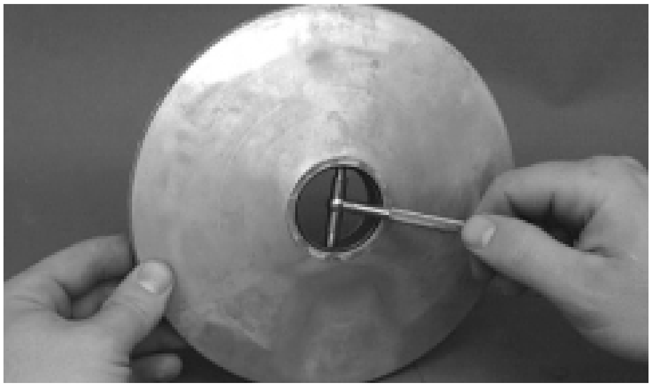
Fig. 8-14



AM077D

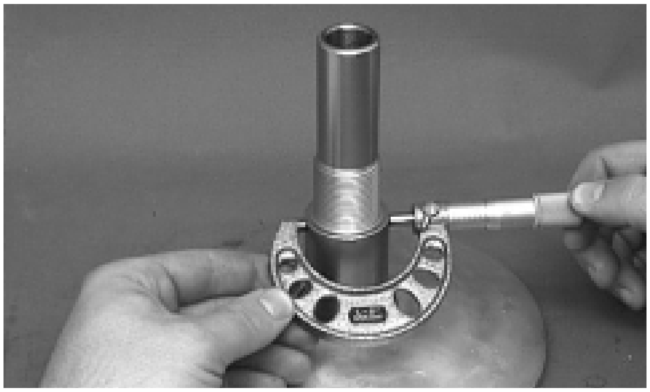
6. Inspect the bushing in the movable sheave for wear, damage, or cracks. Measure the inside diameter of the bushing and the outside diameter of the stationary sheave hub. The difference (clearance) must be less than 0.20 mm (0.008 in.). If movable sheave bushing is not within specifications, replace the movable sheave.

Fig. 8-15



AM023D

Fig. 8-16



AM079D

7. Inspect the spring for proper compression rate qualities.

P/N	Color	Rate @ 2 9/16 in.	Rate @ 1 5/16 in.
0646-148	Red/Blue	53 lb	224 lb
0646-150	Silver	72 lb	188 lb
0646-149	Red	74 lb	228 lb
0646-147	Yellow/Green	114 lb	267 lb
0646-155	Purple	121 lb	240 lb
0646-229	Yellow/White	122 lb	285 lb
0646-248	Orange/White	143 lb	290 lb

8. Inspect the cam arms for any uneven wear pattern or damage to the bushings.

9. Inspect all threaded areas for any cracked or stripped threads.

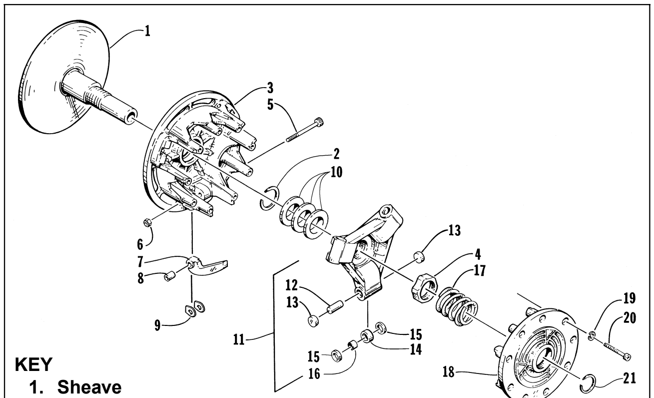
10. Inspect rollers for damage or wear.

11. Inspect the roller bushings for damage or fraying.

12. Inspect the stationary sheave and shaft for damage or wear.

ASSEMBLING

Fig. 8-17



KEY
1. Sheave
2. Snap Ring
3. Sheave
4. Nut
5. Pin
6. Lock Nut
7. Cam Arm
8. Bushing
9. Washer
10. Spacer Washer
11. Spider Assy
12. Spider Pin
13. Spider Button
14. Roller
15. Washer
16. Bearing
17. Spring
18. Cover
19. Lock Washer
20. Cap Screw
21. Snap Ring

0734-069

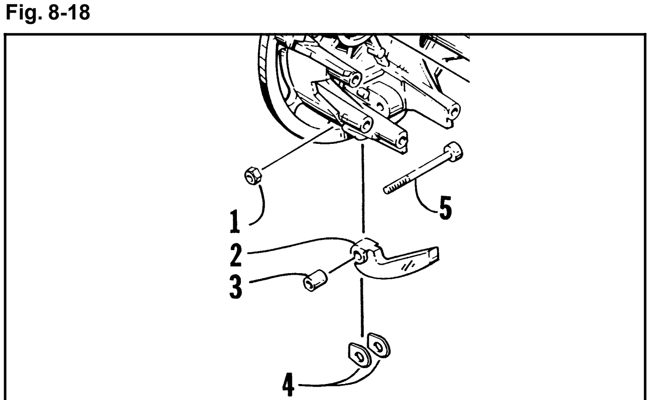
⚠ WARNING

Never reuse the lock nuts on the cam arm pins.

1. Place a cam arm with bushing and washers into position on the movable sheave; then secure with the cam arm pin and lock nut. Carefully tighten the lock nut until it contacts the cam arm pin shoulder; then tighten an additional 1/8 turn. Repeat procedure on the other two cam arms making sure the head of each pin is positioned toward the direction of drive clutch rotation.

■ **NOTE: The drive clutch rotates counterclockwise.**

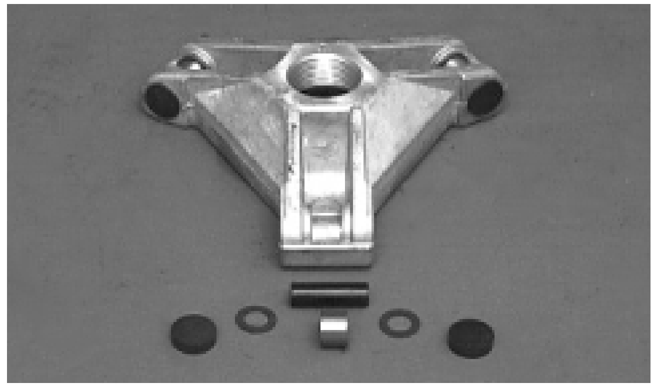
Fig. 8-18



733-452B

2. Place a roller and washers (one on each side of the roller) into position on the spider; then install the pin. Repeat procedure on the other two rollers.

Fig. 8-19



AM071D

3. Place the spider buttons into position; then tap into place until firmly seated.

■ **NOTE: If a spider button does not fit tightly, it must be replaced.**

4. Align the spider and movable sheave timing marks.

⚠ CAUTION

Failure to align the spider and movable sheave timing marks will cause drive clutch to be out of balance resulting in clutch and crankshaft damage.

5. Place the movable sheave, spacer rings, and spider into position on the stationary sheave hub. Make sure all threads are clean and free of oily residue. Apply green Loctite #620 to the entire threaded area of the shaft and thread the spider onto the shaft. Tighten the spider using the spider removal tool to 34.5 kg-m (250 ft-lb).

■ **NOTE: Allow the Loctite to cure at room temperature for 24 hours.**

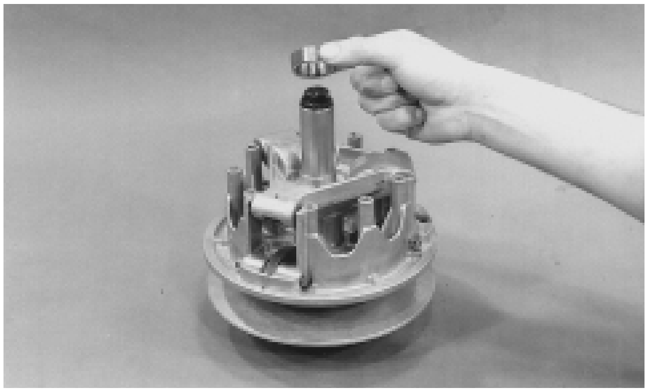
Fig. 8-20



AM072A

6. Apply green Loctite #620 to the threads of the stationary shaft above the spider. Install the large jam nut and tighten to 11.8 kg-m (85 ft-lb).

Fig. 8-21

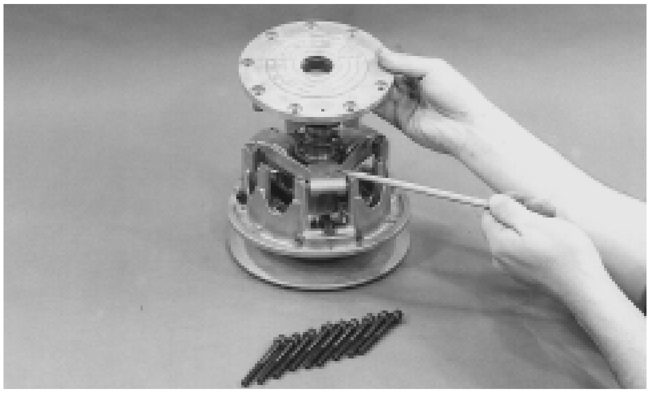


AM066

■ **NOTE: Grasp the movable sheave and lift it upward; then release it. It must move freely and not bind at any point.**

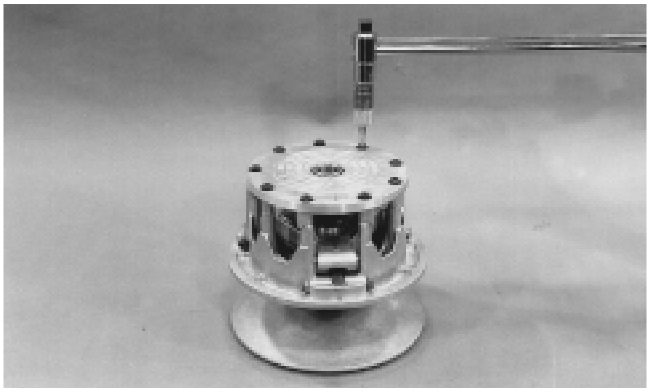
7. Place the spring and cover into position making sure the timing mark on the cover is properly aligned; then compress the spring and install the nine cap screws coated with blue Loctite #242 and lock washers. Tighten evenly to 1.4 kg-m (10 ft-lb).

Fig. 8-22



AM075

Fig. 8-23



AM076

⚠ CAUTION
Care must be taken when installing the cover not to damage the bushing.

INSTALLING

1. Install any spacers as accounted for in removing; then insert the clutch bolt with lock washer.

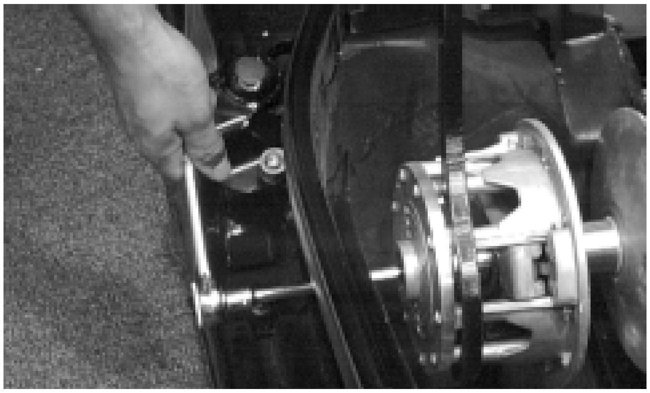
■ **NOTE: Be sure to wipe the clutch taper and crankshaft taper clean of any oil film or dirt before installing the drive clutch.**

2. Place the clutch into position on the crankshaft.

3. Using a 12-point 1/2-in. socket and the drive clutch spanner wrench, tighten the clutch bolt to 6.9-7.6 kg-m (50-55 ft-lb).

⚠ CAUTION
When installing the drive clutch, do not tighten the clutch bolt with any kind of impact tool. Tighten clutch bolt using a hand torque wrench only. Failure to do so could result in stationary sheave damage.

Fig. 8-24



AF477D

4. Check alignment between the drive clutch and driven pulley (see Drive Clutch/Driven Pulley in this section).

Fig. 8-25



AF468D

5. Install the drive belt. Check drive belt deflection (see Drive Clutch/Driven Pulley in this section). Secure the belt guard and install the plug in the belly pan.

⚠ WARNING

Never operate the engine without the belt guard secured.

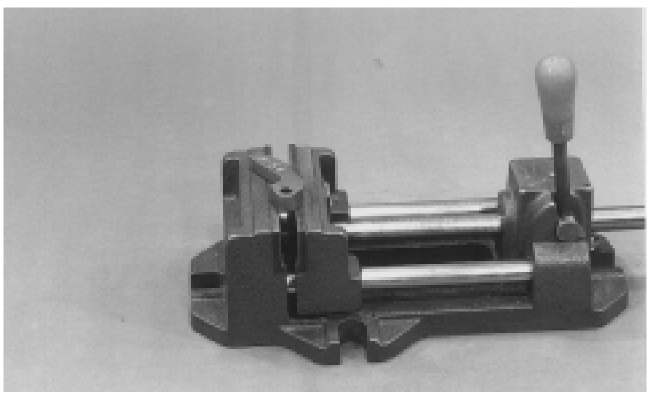
6. Either test drive the snowmobile or run the engine for five minutes; then tighten the drive clutch bolt to 6.9-7.6 kg-m (50-55 ft-lb).

REPLACING CAM ARM BUSHINGS

1. Using a vise, spread the jaws just enough to allow room for the bushing to pass between.

2. Position the cam arm over the spread jaws.

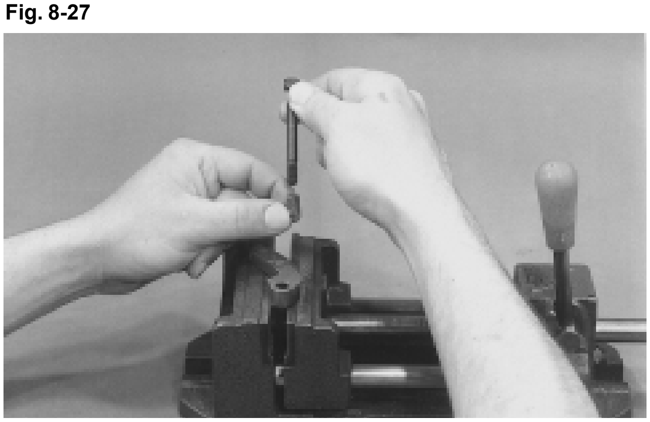
Fig. 8-26



AM094

3. Slide a new bushing onto one of the cam arm pins; then position the pin through the cam arm bushing.

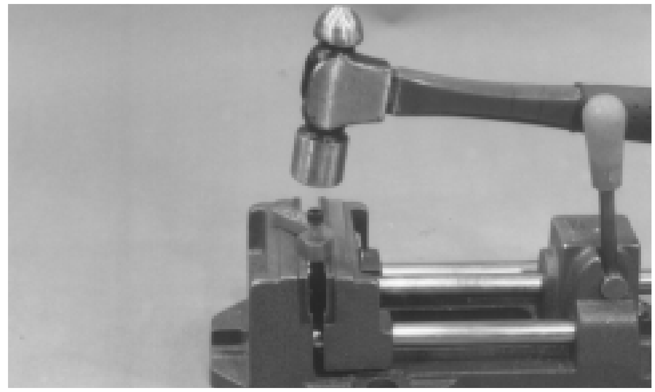
Fig. 8-27



AM095

4. Using the new bushing as a tool, drive the worn bushing from the cam arm. When the head of the cam arm pin contacts the cam arm, the new bushing will be properly seated.

Fig. 8-28



AM096

Driven Pulley

REMOVING

1. Open the hood; then open the belt guard.

2. Remove the drive belt.

3. Remove the cap screw and washer securing the driven pulley; then account for and note the position of any alignment washers.

Fig. 8-29



SC013D

4. Slide the driven pulley off the driven shaft; then remove pulley from the engine compartment.

■ **NOTE: If the driven pulley is tight on the shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**

5. Remove the key, alignment washers, and stub shaft from the driven shaft.

Fig. 8-30



AF120D

DISASSEMBLING

1. Scribe a line across all driven pulley components to ensure correct assembly and pulley balance.

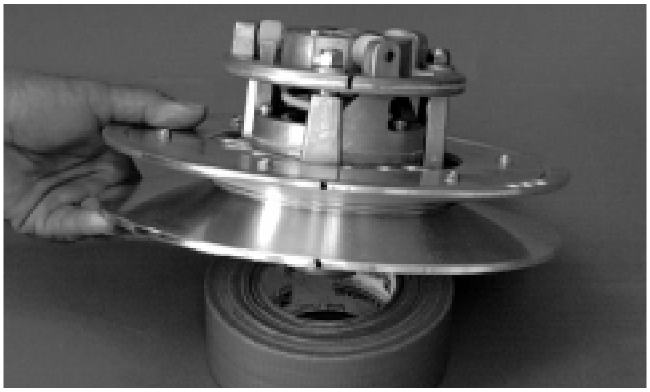
Fig. 8-31



SC001D

2. Place the driven pulley on a work fixture so the roller plate is directed upward.

Fig. 8-32



SC002D

■ **NOTE: To aid in driven pulley servicing, use a roll of duct tape as a work fixture. The work fixture will increase the stability of the pulley during the repair procedure.**

3. Remove the three lock nuts securing the roller plate; then carefully slide the plate off the stationary shaft allowing the spring to release tension.

⚠ WARNING

The roller plate is under spring pressure. Care must be taken when removing the lock nuts to prevent the plate from ejecting prematurely.

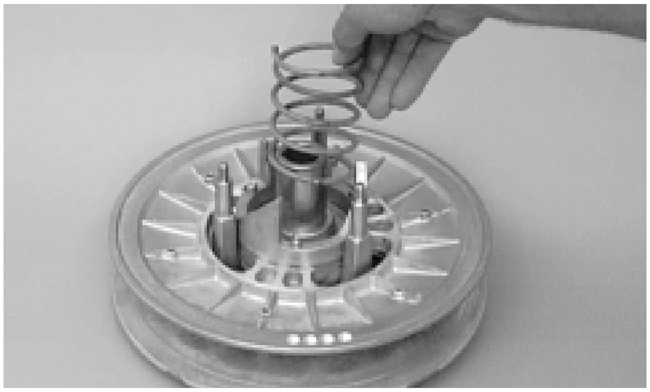
Fig. 8-33



SC003D

4. Remove the spring.

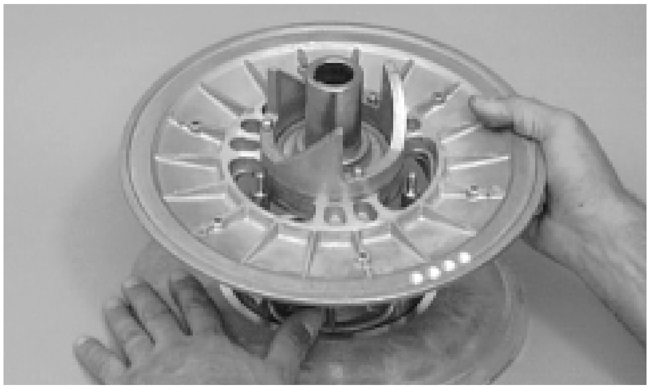
Fig. 8-34



B458D

5. Slide the movable sheave off the stationary shaft; then remove any washers located between the sheaves noting the position of washers for assembling purposes.

Fig. 8-35



B459D

8

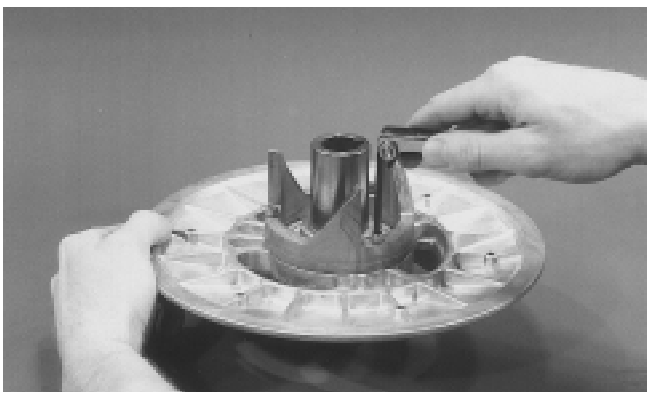
Fig. 8-36



B460

6. Remove the three socket-head cap screws and lock washers securing the torque bracket (cam) to the stationary sheave; then remove torque bracket.

Fig. 8-37



AI062

7. Place the roller plate on a work fixture (roll of duct tape, etc.).

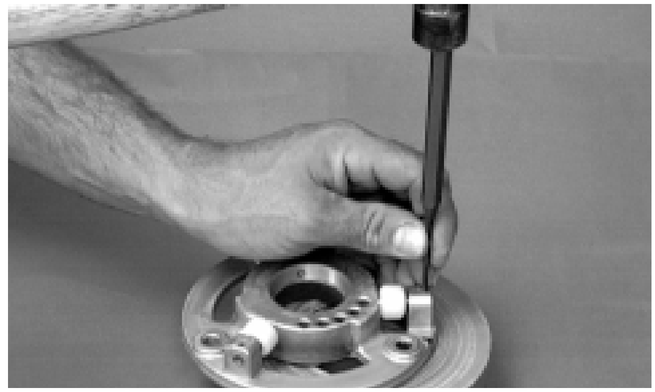
Fig. 8-38



SC004D

8. Using a 1/8-in. punch, remove the roll pin securing the roller, pin, and thrust washer to the plate.

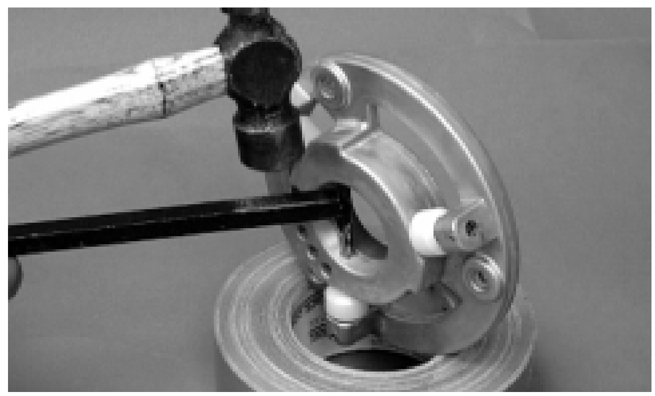
Fig. 8-39



SC005D

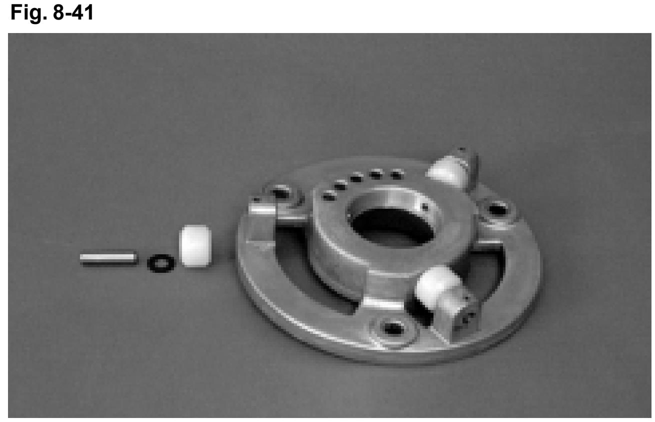
9. Using the Roller Pin Removal Tool (p/n 0644-276) from inside the plate, drive the roller pin out of the plate. Account for the pin, thrust washers, and roller.

Fig. 8-40



SC006D

Fig. 8-41



SC007D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Using parts-cleaning solvent, wash grease, drive belt dust, and foreign matter off all components.

⚠ CAUTION

Do not use steel wool or a wire brush to clean driven pulley components. A wire brush or steel wool will cause the sheaves to be gouged (thus, the drive belt may not slide properly between sheaves). Decreased performance and possible accelerated drive belt wear will result.

2. Inspect the rollers for damage, cracks, or wear.

3. Inspect the sheaves for any gouges, cracks, or other damage. Also, inspect threaded areas of sheaves for damaged or stripped threads.

4. Inspect the torque bracket (cam) for cracks or damage. The ramp portions of the bracket and caps must be free of gouges and damage. Minor scratches may be repaired using #320 grit wet-or-dry sandpaper.

Fig. 8-42



B465

5. Inspect spring for distortion, crystallization, or breaks.

6. Inspect the roller plate, rollers, pins, and spring mounting holes for cracks, damage, or wear.

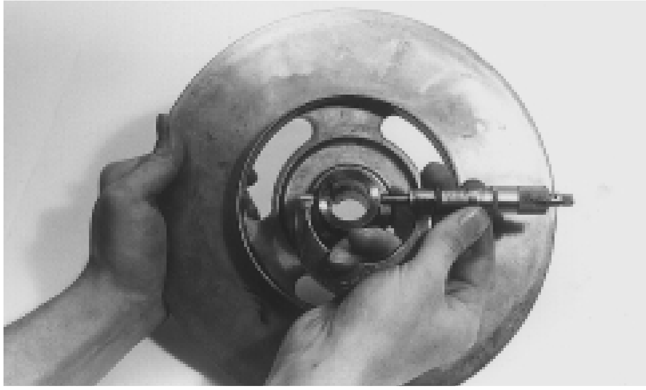
7. Inspect the roller plate and movable sheave bearings for wear. For each respective bearing, measure the outside diameter of the shaft and the inside diameter of the bearing. Compare the readings. Clearance between the shaft and the respective bearing must not exceed 0.5 mm (0.020 in.). If the clearance exceeds the specification, the bearing must be replaced.

Fig. 8-43



B466D

Fig. 8-44



B467

REMOVING BEARINGS

To remove driven pulley bearings, use the Bearing Removal and Installation Tool (p/n 0644-167) and the following procedure.

⚠ WARNING

Always wear safety glasses when using the bearing driver.

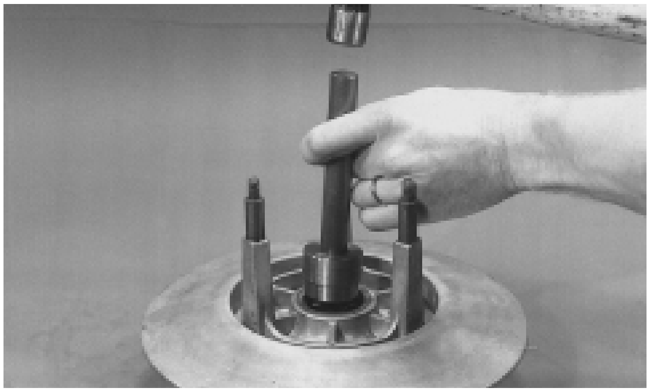
■ **NOTE: To remove the movable sheave bearing, heat must be applied around the bearing.**

1. Place the movable sheave (or roller plate) flat on a press.

2. Using the bearing tool, press the bearing out.

8

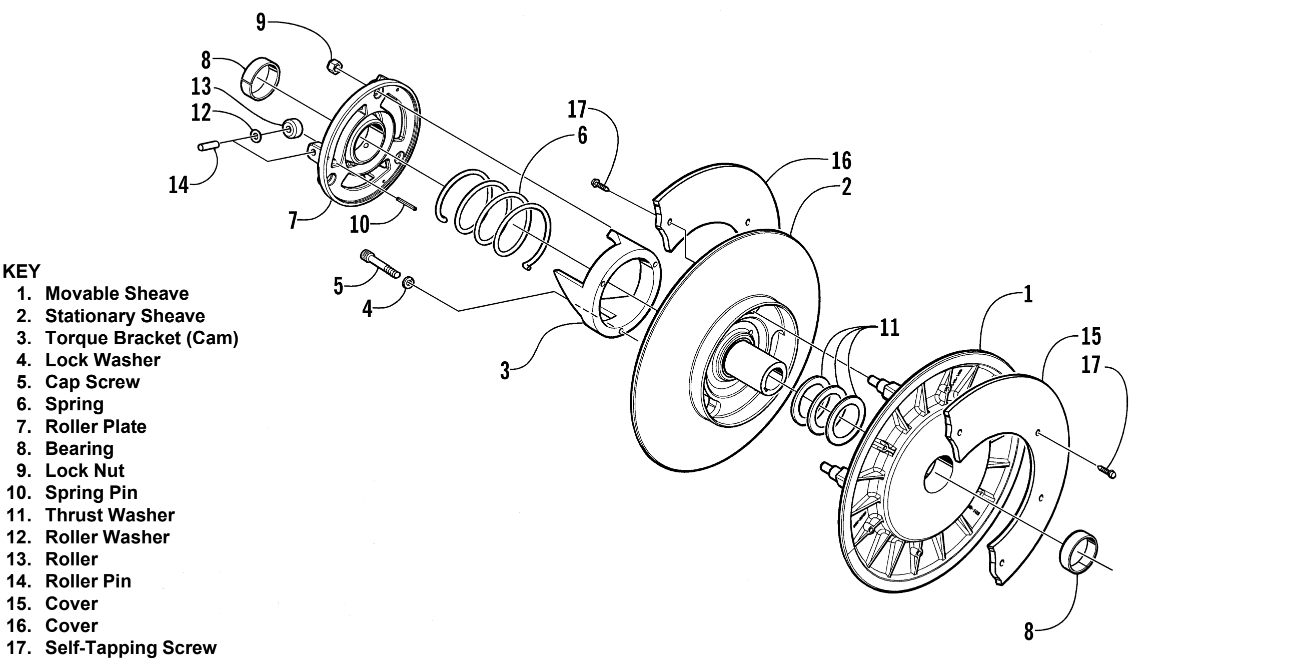
Fig. 8-45



AF154

ASSEMBLING

Fig. 8-46

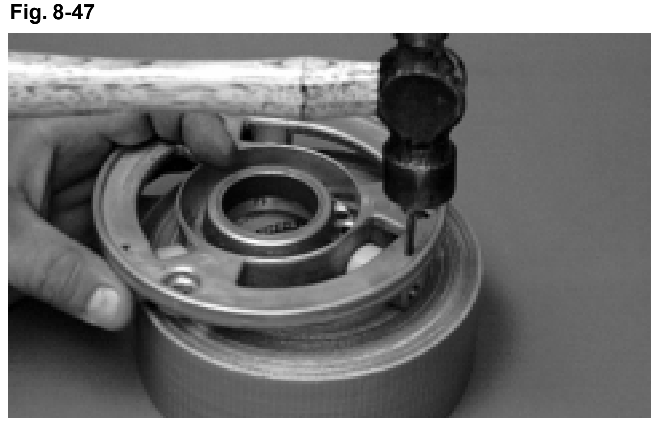


0733-501

1. Place the roller and thrust washer (toward the outside of the roller plate) and secure with the roller pin.

2. Secure the roller, thrust washer, and pin into position with the roll pin. Drive the roll pin in until it is flush with the plate.

Fig. 8-47



SC012D

INSTALLING BEARINGS

■ **NOTE: Before installing a bearing, apply red Loctite #271 to the outside face of the bearing.**

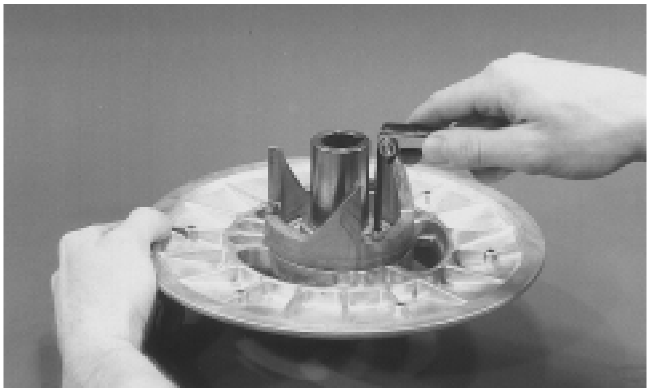
1. Place the movable sheave (or roller plate) flat on a press.

2. Using the bearing tool, press the bearing into position. The bearing must be flush with the outside of the bearing boss.

3. Wipe off excess Loctite. Allow the Loctite to cure for 24 hours at room temperature.

3. Place the torque bracket (cam) into position on the stationary sheave making sure the degree number on the bracket aligns with the part number on the stationary sheave. Install the three socket-head cap screws and lock washers. DO NOT tighten at this time.

Fig. 8-48



AI062

4. Place any washers (as noted during disassembly) on the stationary sheave shaft.

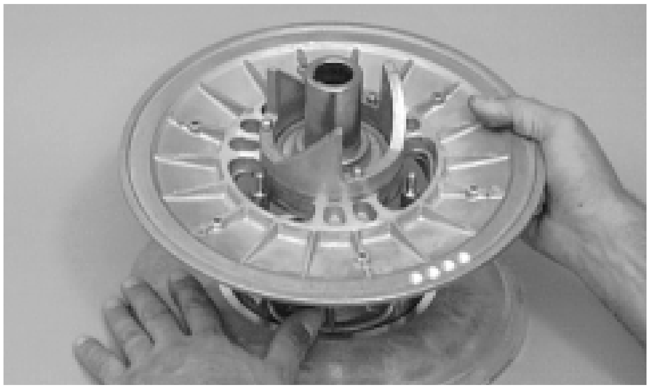
Fig. 8-49



B460

5. Align the scribed line made during disassembly; then slide the movable sheave onto the stationary sheave shaft.

Fig. 8-50

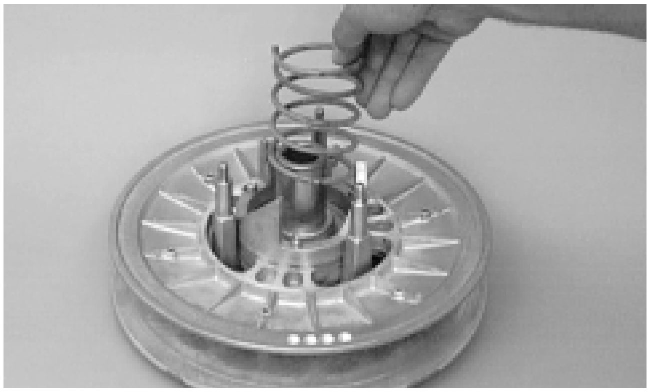


B459D

6. Place the sheaves on a work fixture (roll of duct tape, etc.).

7. Place the spring over the stationary sheave hub and hook the turned down end of the spring into the hole in the casting of the stationary sheave.

Fig. 8-51



B458D

8. Place the roller plate over the spring and hook the turned-up end of the spring in the 3rd hole (standard spring tension) of the plate.

9. While holding the sheaves to prevent them from rotating, grasp the plate and rotate it approximately 120° clockwise until the mounting holes align; then push the plate into position and install the three lock nuts. Tighten the lock nuts to 1.5-1.8 kg-m (11-13 ft-lb).

■ **NOTE: The line scribed during disassembly should be aligned.**

Fig. 8-52



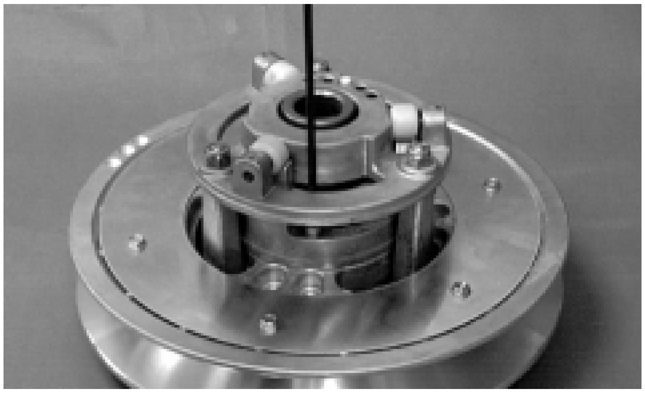
SC003D

10. Rotate the movable sheave to ensure free movement without binding.

11. Rotate the torque bracket (cam) until it is tight; then using a long hex wrench, tighten the three socket-head cap screws securing the bracket.

8

Fig. 8-53



SC011D

INSTALLING

1. Slide the alignment washers onto the end of the driven shaft.

2. Install the key in the driven shaft keyway; then place the stub shaft into the driven pulley. Place the driven pulley on the shaft. Align its keyway with the driven shaft keyway.

■ **NOTE: A small amount of Loctite Anti-Seize Thread Compound (p/n 0678-146) applied to the driven shaft will aid in future driven pulley removal.**

3. Secure the driven pulley by installing any alignment washers, the washer, and cap screw. Tighten the cap screw to 2.6-3.3 kg-m (19-24 ft-lb).

Fig. 8-54



SC013D

4. Check drive clutch/driven pulley alignment (see Drive Clutch/Driven Pulley in this section); adjust as necessary.

5. Install the drive belt and check drive belt deflection (see Drive Clutch/Driven Pulley in this section). Secure the belt guard.

Drive Clutch/ Driven Pulley

CHECKING OFFSET

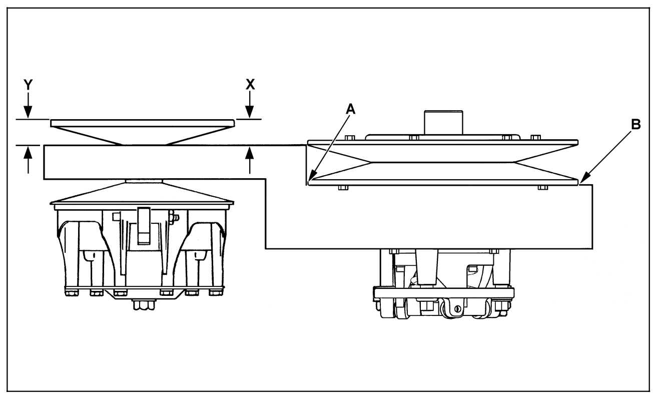
If premature drive belt wear is experienced or if the drive belt turns over, parallelism/offset must be checked. Also, parallelism/offset must be checked whenever either the drive clutch or driven pulley is serviced. To check the parallelism/offset, use the Clutch Alignment Bar (p/n 0644-003) and the following procedure.

1. Open the belt guard and remove the drive belt.

2. Install the clutch alignment bar between the drive clutch sheaves and against the outside edge of the driven pulley stationary sheave.

3. Allow the alignment bar to rest on the drive clutch shaft.

Fig. 8-55



0733-912

■ **NOTE: The alignment bar must extend beyond the front edge of the drive clutch.**

4. With the bar against the outside edge of the driven pulley stationary sheave at points A and B, the bar should just clear the inside edge of the stationary sheave of the drive clutch and rest on the stationary shaft. If the bar does not clear the inside edge or is more than 1.5 mm (0.060 in.) from the inside edge, the offset must be corrected.

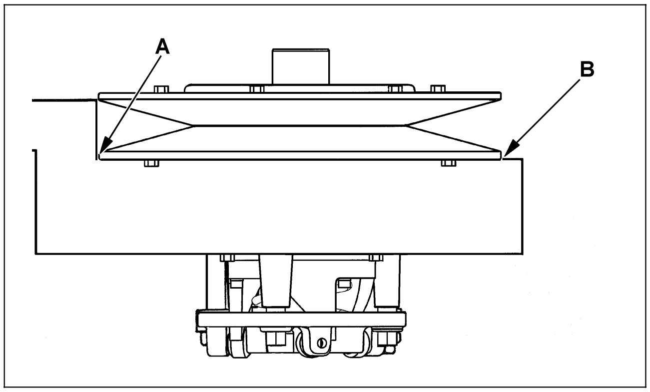
■ **NOTE: On models with a wide ratio driven pulley with the bar against the outside edge of the driven pulley stationary sheave at points A and B, the bar should have between 2.5-4 mm (0.100-0.160 in.) clearance to the inside edge of the stationary sheave of the drive clutch while resting on the stationary shaft. If the clearance is not within specifications, the offset must be corrected.**

Fig. 8-56



AF465D

Fig. 8-57



733-912B

CORRECTING OFFSET

1. To correct offset, the driven pulley must be moved laterally on the driven shaft. Remove the cap screw and washers securing the driven pulley; then remove the driven pulley.

■ **NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**

2. To move the driven pulley inward on the shaft, remove washer(s) as required from behind the pulley.

3. To move the driven pulley outward on the shaft, add alignment washer(s) as required behind the driven pulley.

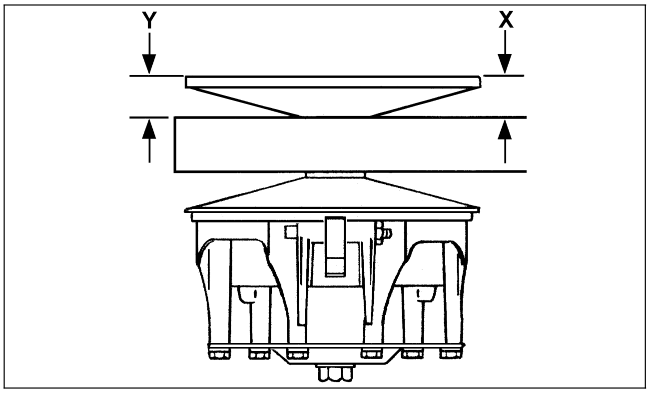
■ **NOTE: Make sure the keyways match when installing the driven pulley. Arrange washers to allow the least amount of "float" on the driven shaft. A maximum of 1.5 mm (0.060 in.) of float is acceptable.**

4. Install the driven pulley and secure with a cap screw and washers. Tighten the cap screw to 2.6-3.3 kg-m (19-24 ft-lb).

CHECKING PARALLELISM

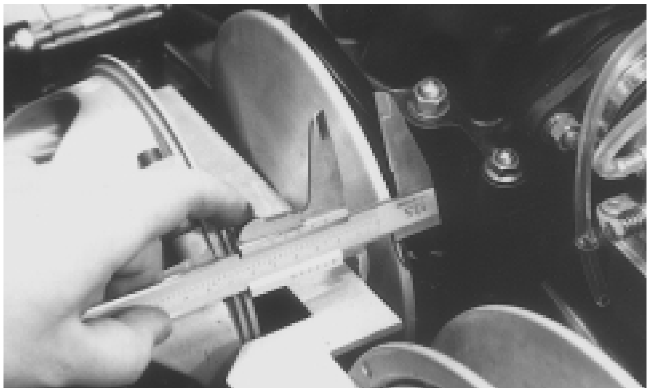
1. Check parallelism of the drive clutch/driven pulley using the alignment bar and reference points X and Y with the alignment bar against the driven pulley at points A and B. Using a calipers or a machinist's scale, measure X and Y from the back side of the alignment bar. Measurements X and Y must be equal or measurement Y must be more than measurement X, but Y must not exceed measurement X by more than 1.6 mm (0.062 in.).

Fig. 8-58



733-912A

Fig. 8-59



AF041

■ **NOTE: The offset must be correct before checking parallelism.**

2. If parallelism is not within specifications, the parallelism must be corrected.

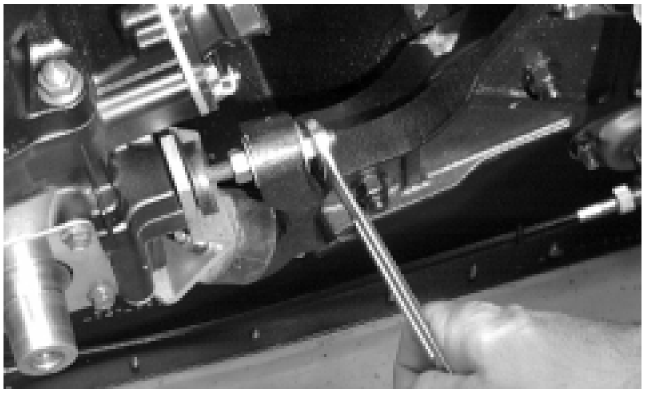
CORRECTING PARALLELISM (Torque Bumper w/Bearing Support Bracket)

1. To correct parallelism, minor adjustments can be made by adjusting the torque bumper on the left-rear engine mount.

   A. Loosen the cap screws and nuts securing the engine mounting brackets to the front end.

B. Using the jam nuts on the torque bumper, adjust parallelism and periodically check the parallelism. When the parallelism is correct, tighten the cap screws and nuts securing the engine mounting brackets to the front end; then tighten the torque bumper jam nuts allowing 1.5 mm (0.060 in.) clearance between the torque bumper and the engine.

Fig. 8-60



AN610D

2. Recheck both offset and parallelism to ensure accuracy and make further adjustments as necessary.

■ **NOTE: After parallelism and offset have been corrected, check for proper drive belt deflection. This is critical for optimum performance.**

CORRECTING PARALLELISM (Torque Bumper w/Shims)

1. To correct parallelism, minor adjustments can be made by removing shims from or installing shims on the left-rear engine mount.

   A. Loosen the cap screws securing the engine mounting brackets to the front end.

   B. Add or remove shims as needed to attain correct parallelism.

   C. When parallelism is correct, secure the engine mounting brackets to the front end.

2. Recheck both offset and parallelism to ensure accuracy and make further adjustments as necessary.

■ **NOTE: After parallelism and offset have been corrected, check for proper drive belt deflection. This is critical for optimum performance.**

CORRECTING PARALLELISM (Engine Snubber w/Engine Plate)

1. To correct parallelism, minor adjustments can be made by adjusting the engine snubber on the left-rear engine mount.

   A. Loosen the cap screws securing the engine plate to the engine mounts.

   B. Either lengthen or shorten the snubber and periodically check the parallelism measurement. When the parallelism measurement is correct, loosen the snubber to allow 1.5 mm (0.060 in.) clearance between the snubber and the engine; then lock the jam nuts on the snubber and tighten the cap screws securing the engine plate.

2. Recheck both offset and parallelism to ensure accuracy and make further adjustments as necessary.

■ **NOTE: After parallelism and offset have been corrected, check for proper drive belt deflection. This is critical for optimum performance.**

DRIVE BELT DEFLECTION

Drive belt length, condition, and deflection are all important for peak performance. To check and adjust drive belt deflection, use the following procedure.

1. Turn the engine off; then open the belt guard.

2. Make sure the drive belt is sitting at the top of the driven pulley sheaves.

3. Place a straightedge on top of the drive belt. The straightedge should reach from the drive clutch to the top of the driven pulley.

4. Using a stiff ruler centered between the drive clutch and driven pulley, push down on the drive belt just enough to remove all slack. Note the amount of deflection on the ruler at the bottom of the straightedge. The deflection should be within the range of 25-31 mm (1-1 1/4 in.).

■ **NOTE: Push down on the belt with the ruler only until the bottom of the belt flexes upward; then read the amount of deflection.**

5. To correct drive belt deflection, washers can be removed or added between the stationary and movable sheaves of the driven pulley.

■ **NOTE: If the drive belt deflection is above specifications, the snowmobile will bog and lack power at clutch engagement. For good performance, proper belt deflection is critical.**

6. Secure the belt guard.

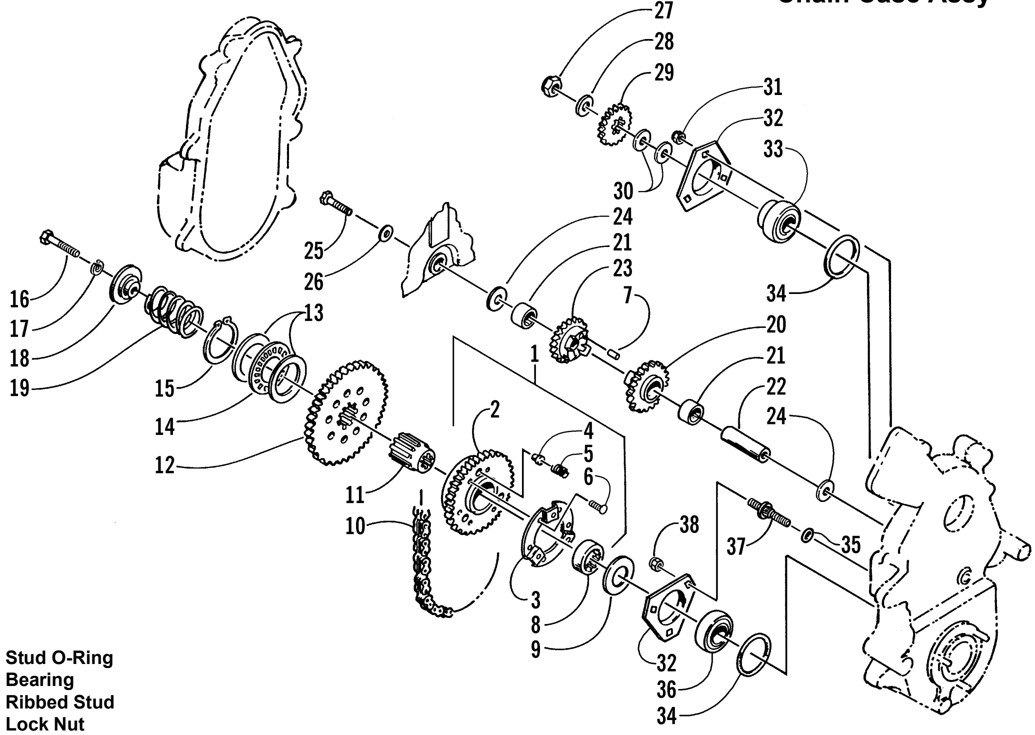
Drive Train Schematics (W/Reverse)

■ **NOTE: Determine which type of drive train is being serviced and refer to the appropriate illustration for component details; then disassemble and assemble accordingly.**

Fig. 8-61

KEY
1. Sprocket Assy
2. Sprocket
3. Spring Retainer
4. Slip Pin
5. Compression Spring
6. Cap Screw
7. Aligner
8. Bearing
9. Shaft Spacer
10. Chain
11. Driveshaft Extension
12. Reverse Gear
13. Thrust Washer
14. Thrust Bearing
15. Retaining Ring
16. Cap Screw
17. Lock Washer
18. Shaft Retainer
19. Return Spring
20. Reverse Sprocket
21. Bearing
22. Reverse Shaft
23. Reverse Idler Assy
24. Reverse Idler Spacer
25. Cap Screw
26. Washer
27. Lock Nut
28. Spring Washer
29. Sprocket
30. Washer
31. Lock Nut
32. Flange Plate
33. Bearing
34. O-Ring Seal
35. Stud O-Ring
36. Bearing
37. Ribbed Stud
38. Lock Nut

Chain Case Assy



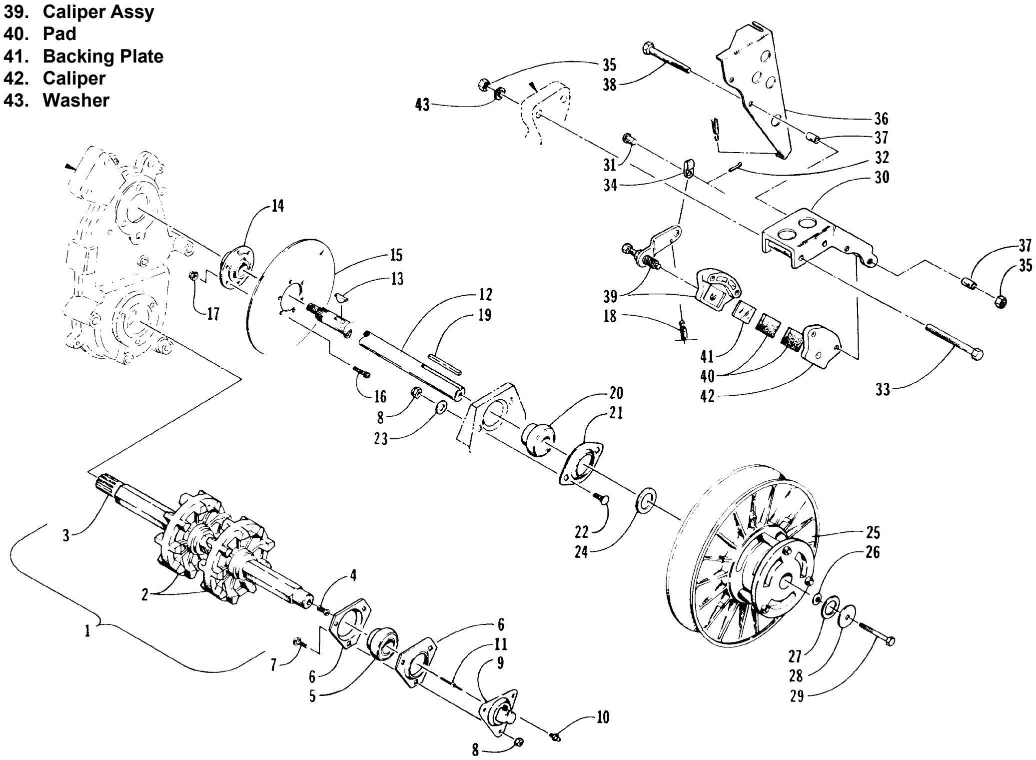
0734-587

8

Fig. 8-62

KEY
1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Drive Bushing
5. Bearing
6. Flange Plate
7. Carriage Bolt
8. Lock Nut
9. Drive Adapter
10. Grease Fitting
11. Cable Adapter
12. Driven Shaft
13. Key
14. Disc Hub
15. Brake Disc
16. Screw
17. Lock Nut
18. Return Spring
19. Key
20. Bearing
21. Flange Plate
22. Carriage Bolt
23. Washer
24. Washer
25. Driven Pulley
26. Washer
27. Washer
28. Washer
29. Cap Screw
30. Brake Bracket
31. Clevis Pin
32. Cotter Pin
33. Cap Screw
34. Clevis
35. Crown Nut
36. Bracket
37. Spacer
38. Cap Screw
39. Caliper Assy
40. Pad
41. Backing Plate
42. Caliper
43. Washer

Drive & Driven Shafts/ Mechanical Brake Assy

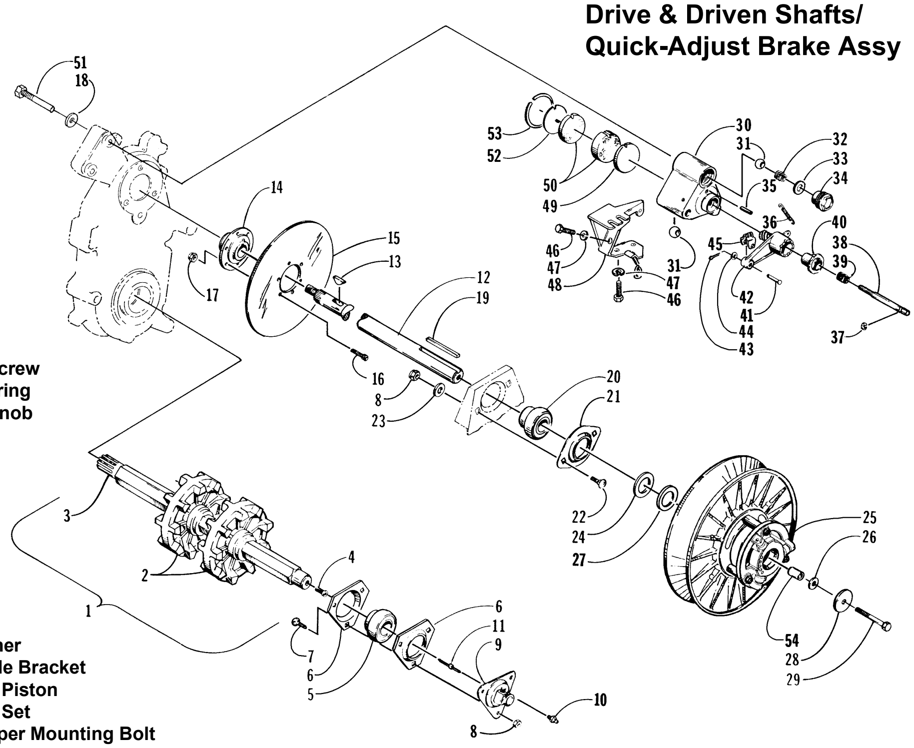


0731-806

Fig. 8-63

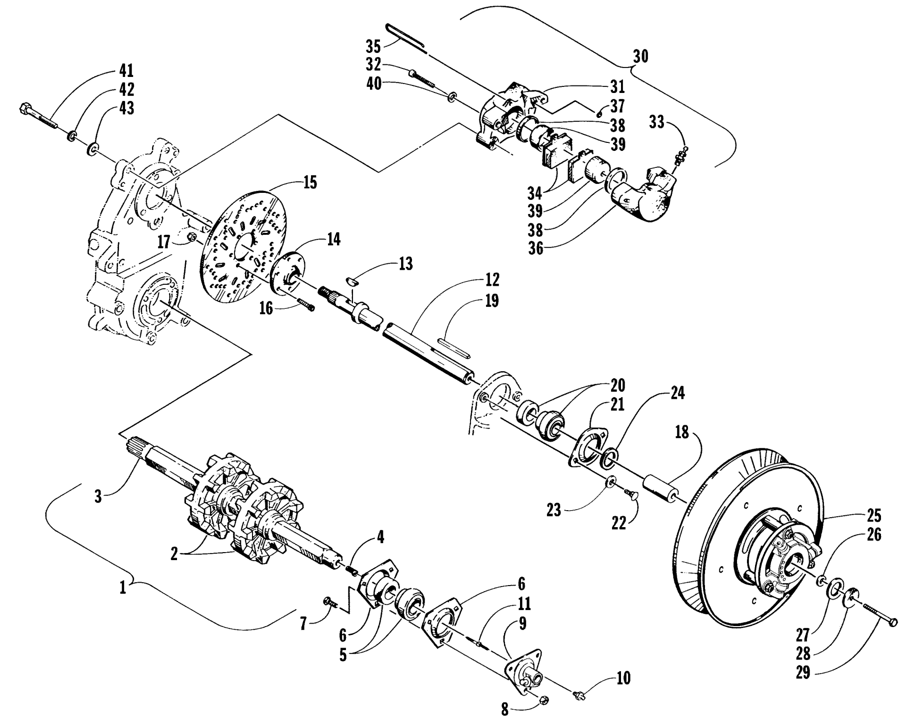
KEY
1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Drive Bushing
5. Bearing
6. Flange Plate
7. Carriage Bolt
8. Lock Nut
9. Drive Adapter
10. Grease Fitting
11. Cable Adapter
12. Driven Shaft
13. Key
14. Disc Hub
15. Brake Disc
16. Cap Screw
17. Lock Nut
18. Washer
19. Key
20. Bearing
21. Flange Plate
22. Carriage Bolt
23. Washer
24. Washer
25. Driven Pulley
26. Washer
27. Washer
28. Washer
29. Cap Screw
30. Brake Caliper
31. Alignment Ball
32. Compression Spring
33. Washer
34. Brake Caliper Nut
35. Spring Pin
36. Return Spring
37. Snap Ring
38. Brake Adjuster Screw
39. Compression Spring
40. Brake Adjuster Knob
41. Pin
42. Activator Arm
43. Cotter Pin
44. Washer
45. Clevis
46. Cap Screw
47. Lock Washer
48. Brake Cable Bracket
49. Brake Pad Piston
50. Brake Pad Set
51. Brake Caliper Mounting Bolt
52. Stationary Pad Backing Plate
53. Snap Ring
54. Stub Shaft

Drive & Driven Shafts/ Quick-Adjust Brake Assy



0733-379

Fig. 8-64



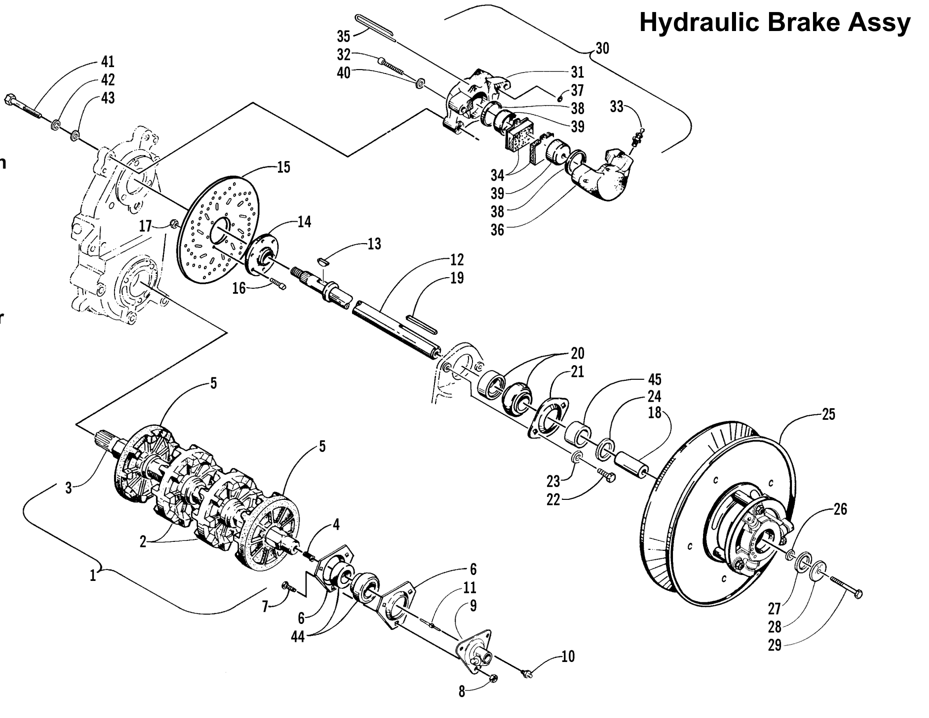
0734-203

Fig. 8-65

Drive & Driven Shafts/ Hydraulic Brake Assy

KEY

1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Drive Bushing
5. Sprocket
6. Flange Plate
7. Carriage Bolt
8. Lock Nut
9. Drive Adapter
10. Grease Fitting
11. Cable Adapter
12. Driven Shaft
13. Key
14. Disc Hub
15. Brake Disc
16. Cap Screw
17. Lock Nut
18. Stub Shaft
19. Key
20. Bearing
21. Flange Plate
22. Cap Screw
23. Washer
24. Washer
25. Driven Pulley
26. Washer
27. Washer
28. Washer
29. Cap Screw
30. Brake Caliper Assy
31. Housing
32. Cap Screw
33. Bleeder Fitting
34. Brake Pad Set
35. Retaining Pin
36. Housing
37. O-Ring
38. O-Ring
39. Piston
40. Washer
41. Cap Screw
42. Lock Washer
43. Washer
44. Bearing
45. Spacer



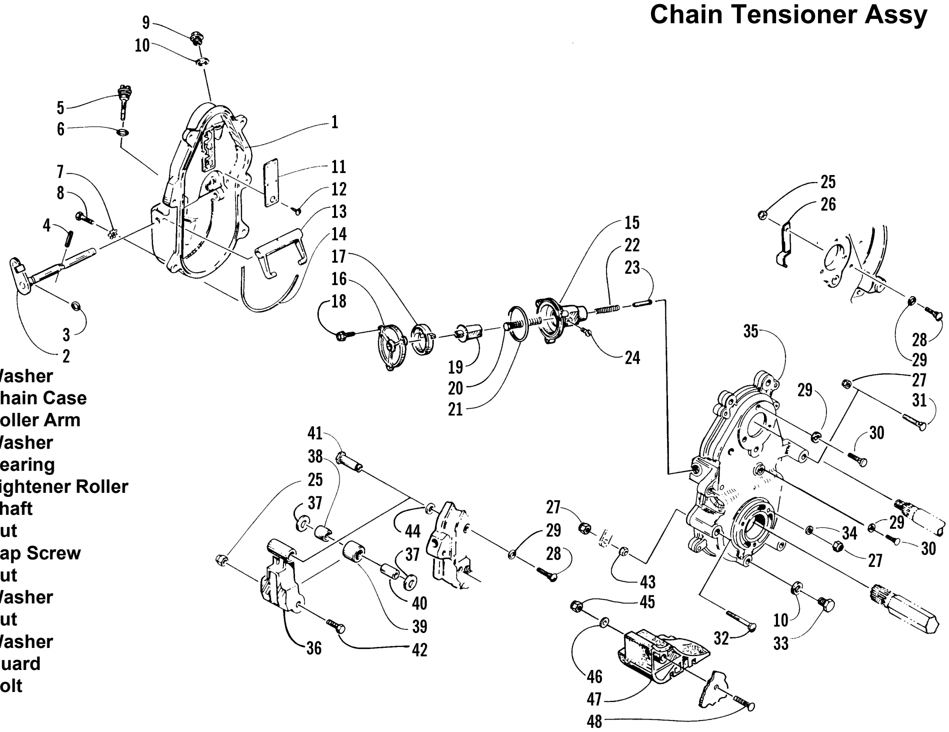
0734-393

8

Fig. 8-66

Chain Tensioner Assy

KEY
1. Cover
2. Shift Fork Shaft
3. O-Ring Seal
4. Spring Pin
5. Oil Level Stick
6. O-Ring
7. Lock Washer
8. Cap Screw
9. Plug
10. Fiber Washer
11. Cover
12. Self-Tapping Screw
13. Shift Fork
14. Seal
15. Screw Housing
16. Cover
17. Power Spring
18. Self-Tapping Screw
19. Chain Adjuster Shaft
20. Chain Adjuster Screw
21. O-Ring
22. Compression Spring
23. Rivet
24. Machine Screw
25. Lock Nut
26. Bracket
27. Lock Nut
28. Ribbed Bolt
29. O-Ring
30. Ribbed Bolt
31. Carriage Bolt
32. Carriage Bolt
33. Plug
34. Washer
35. Chain Case
36. Roller Arm
37. Washer
38. Bearing
39. Tightener Roller
40. Shaft
41. Nut
42. Cap Screw
43. Nut
44. Washer
45. Nut
46. Washer
47. Guard
48. Bolt

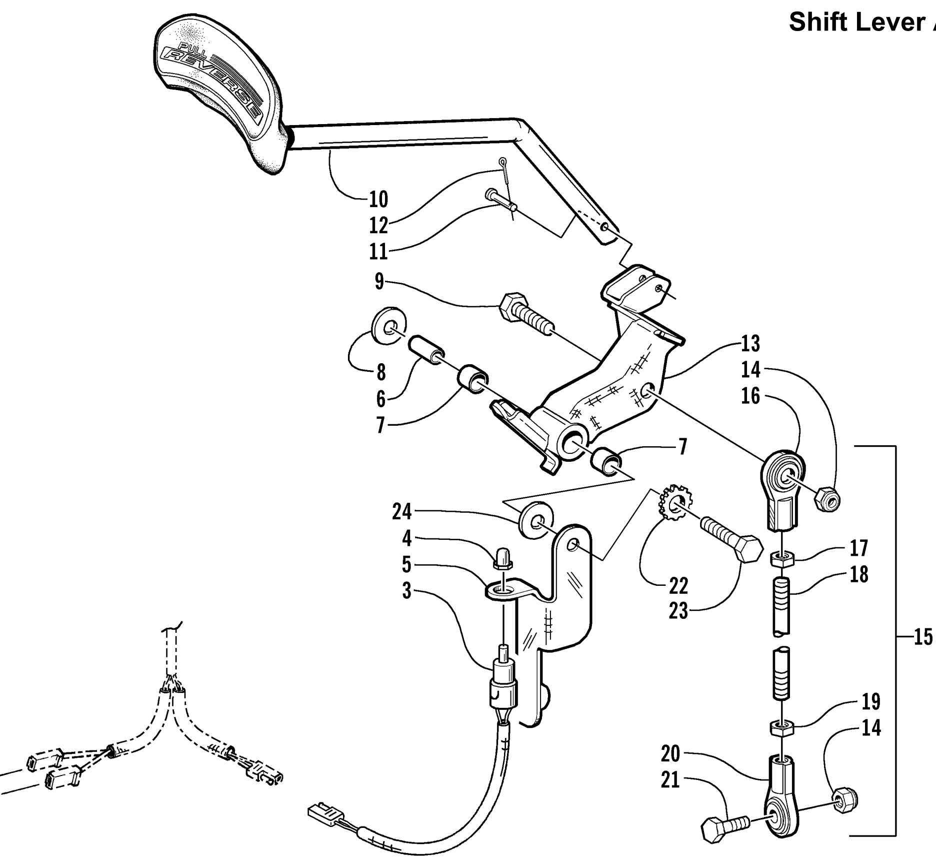


0734-449

Fig. 8-67

Shift Lever Assy

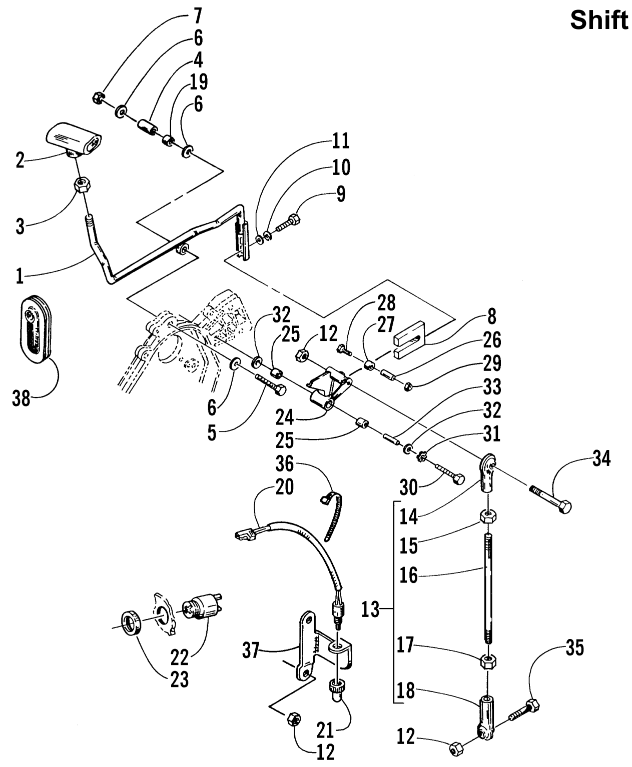
KEY
1. Retaining Ring
2. Reverse Alarm
3. Alarm Switch
4. Switch Boot
5. Bracket
6. Axle
7. Bushing
8. Washer
9. Cap Screw
10. Lever
11. Clevis Pin
12. Cotter Pin
13. Shift Pivot
14. Hex Nut
15. Shift Linkage Assy
16. Rod End
17. Jam Nut
18. Linkage Rod
19. Jam Nut
20. Rod End
21. Cap Screw
22. External Tooth Washer
23. Cap Screw
24. Washer



0734-253

Fig. 8-68

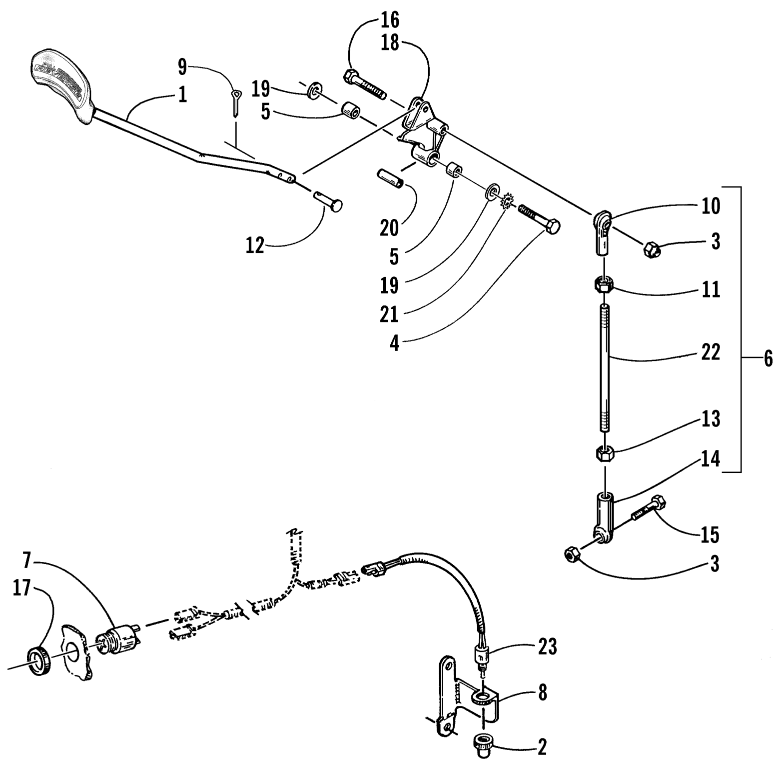
KEY
1. Shift Lever
2. Grip
3. Nut
4. Pivot Axle
5. Cap Screw
6. Washer
7. Lock Nut
8. Cam
9. Cap Screw
10. Lock Washer
11. Washer
12. Nut
13. Shifting Linkage Assy
14. Rod End
15. Nut
16. Shift Rod
17. Nut
18. Rod End
19. Bearing
20. Alarm Switch
21. Switch Boot
22. Reverse Alarm
23. Retaining Ring
24. Pivot
25. Bearing
26. Axle
27. Bearing
28. Cap Screw
29. Nut
30. Cap Screw
31. Lock Washer
32. Washer
33. Axle
34. Cap Screw
35. Cap Screw
36. Cable Tie
37. Bracket
38. Grommet



0734-637

Fig. 8-69

KEY
1. Lever
2. Switch Boot
3. Lock Nut
4. Cap Screw
5. Bushing
6. Shift Linkage Assy
7. Reverse Alarm
8. Bracket
9. Cotter Pin
10. Rod End
11. Nut
12. Clevis Pin
13. Nut
14. Rod End
15. Cap Screw
16. Cap Screw
17. Retaining Screw
18. Shift Pivot
19. Washer
20. Axle
21. Lock Washer
22. Linkage Rod
23. Alarm Switch



0734-450

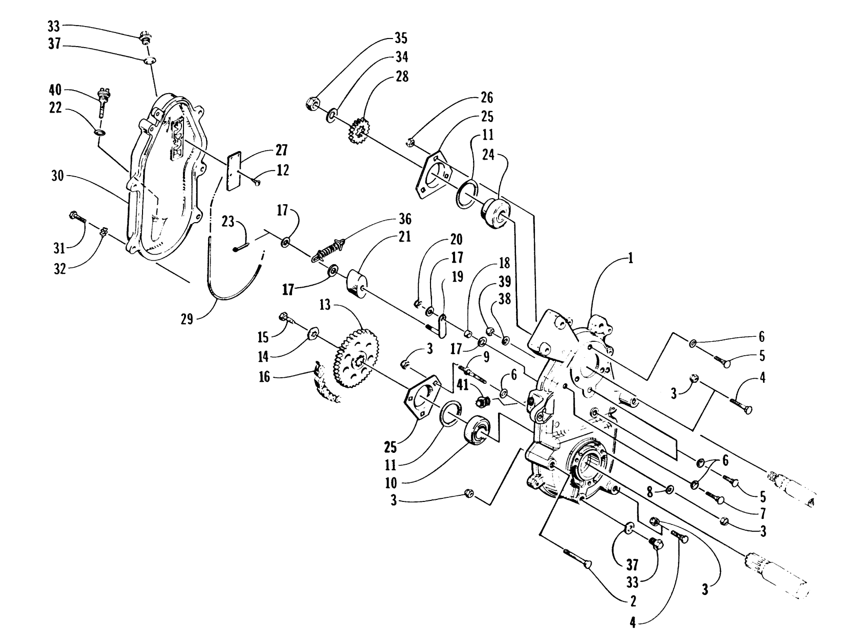
Drive Train Schematics (W/O Reverse)

■ **NOTE: Determine which type of drive train is being serviced and refer to the appropriate illustration for component details; then disassemble and assemble accordingly.**

Fig. 8-70

Chain Case Assy

KEY
1. Chain Case w/Plugs
2. Carriage Bolt
3. Lock Nut
4. Carriage Bolt
5. Ribbed Bolt
6. Stud O-Ring
7. Ribbed Bolt
8. Washer
9. Stud
10. Bearing
11. Seal
12. Machine Screw
13. Sprocket
14. Pyramidal Washer
15. Cap Screw
16. Chain
17. Washer
18. Bushing
19. Tightener Arm
20. Lock Nut
21. Pad
22. O-Ring
23. Cotter Pin
24. Bearing
25. Flange Plate
26. Lock Nut
27. Cover
28. Sprocket
29. Seal
30. Cover
31. Cap Screw
32. Lock Washer
33. Plug
34. Spring Washer
35. Lock Nut
36. Spring Assy
37. Washer
38. Washer
39. Nut
40. Oil Level Stick
41. Plug

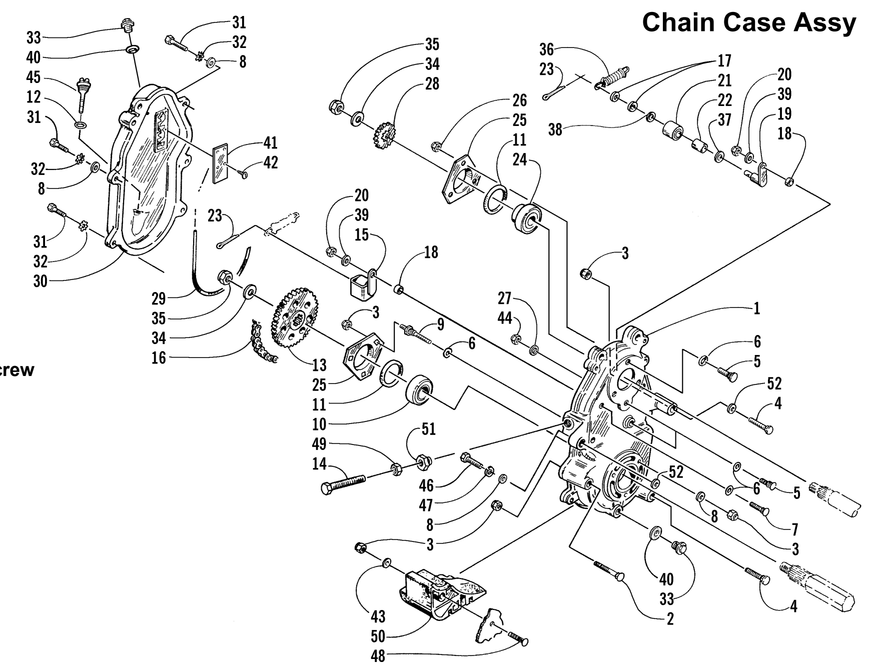


0733-211

Fig. 8-71

Chain Case Assy

KEY
1. Chain Case
2. Carriage Bolt
3. Lock Nut
4. Cap Screw
5. Ribbed Bolt
6. O-Ring
7. Ribbed Bolt
8. Washer
9. Stud
10. Bearing
11. Seal
12. O-Ring
13. Sprocket
14. Chain Adjuster
15. Tightener Arm Assy
16. Chain
17. Washer
18. Bushing
19. Tightener Arm
20. Lock Nut
21. Roller
22. Bearing
23. Cotter Pin
24. Bearing
25. Flange Plate
26. Lock Nut
27. Washer
28. Sprocket
29. Seal
30. Cover
31. Cap Screw
32. Lock Washer
33. Plug
34. Spring Washer
35. Lock Nut
36. Spring Assy
37. Washer
38. Washer
39. Washer
40. Fiber Washer
41. Vent Cover
42. Self-Tapping Screw
43. Washer
44. Nut
45. Oil Level Stick
46. Cap Screw
47. Lock Washer
48. Ribbed Bolt
49. Nut
50. Guard
51. Adapter
52. Washer



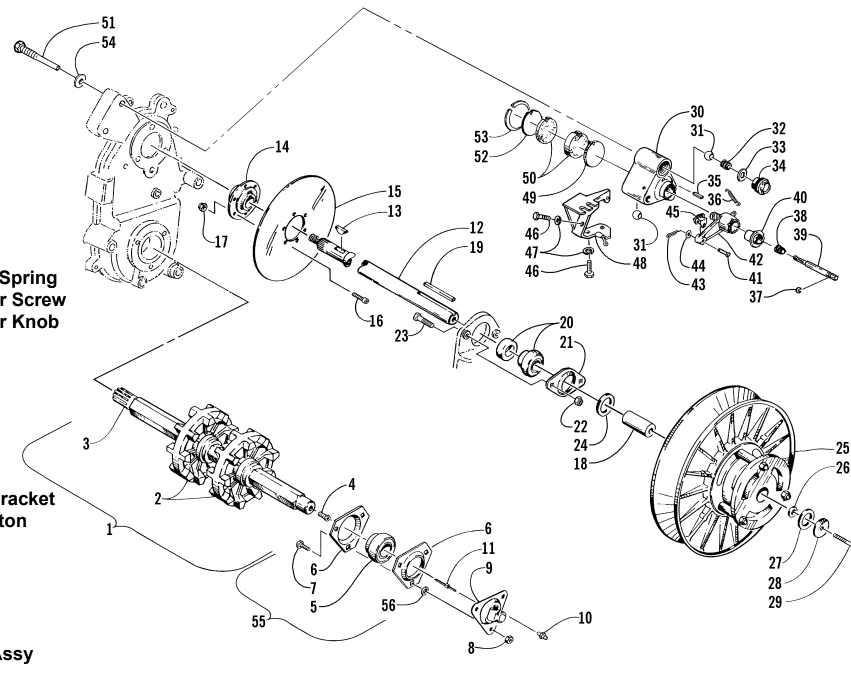
0734-139

Fig. 8-72

Drive & Driven Shafts/ Quick-Adjust Brake Assy

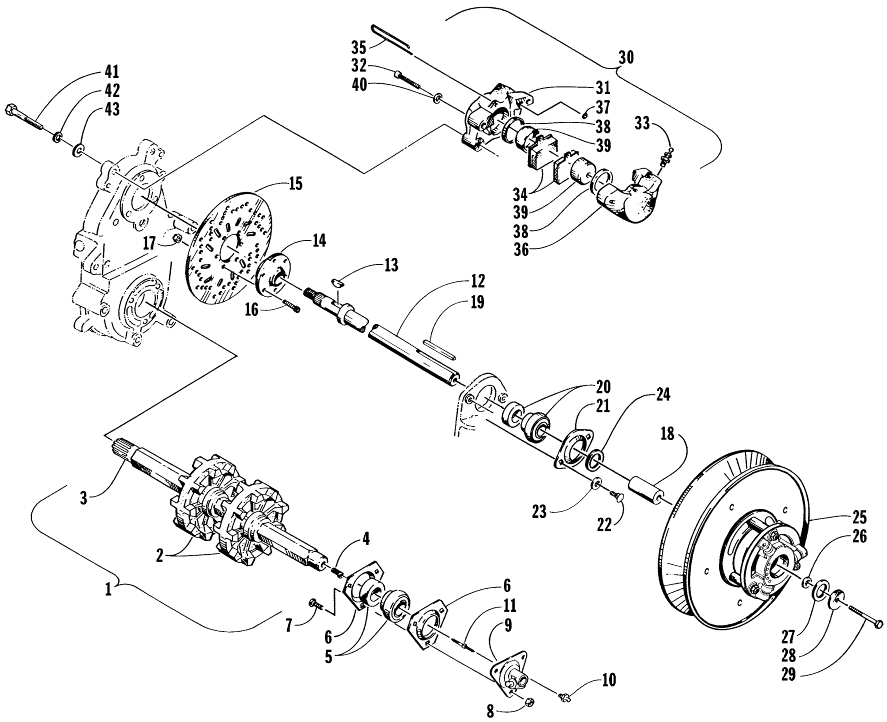
KEY

1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Drive Bushing
5. Bearing
6. Flange Plate
7. Carriage Bolt
8. Lock Nut
9. Drive Adapter
10. Grease Fitting
11. Cable Adapter
12. Driven Shaft
13. Key
14. Disc Hub
15. Brake Disc
16. Socket-Head Cap Screw
17. Lock Nut
18. Stub Shaft
19. Key
20. Bearing
21. Flange Plate
22. Lock Nut
23. Cap Screw
24. Washer
25. Driven Pulley
26. Washer
27. Washer
28. Washer
29. Cap Screw
30. Brake Caliper
31. Alignment Ball
32. Compression Spring
33. Washer
34. Brake Caliper Nut
35. Spring Pin
36. Return Spring
37. E-Ring
38. Compression Spring
39. Brake Adjuster Screw
40. Brake Adjuster Knob
41. Pin
42. Activator Arm
43. Cotter Pin
44. Washer
45. Clevis
46. Cap Screw
47. Lock Washer
48. Brake Cable Bracket
49. Brake Pad Piston
50. Brake Pad Set
51. Mounting Bolt
52. Backing Plate
53. Snap Ring
54. Washer
55. Flange Plate Assy
56. Solder Ring



0734-999

Fig. 8-73

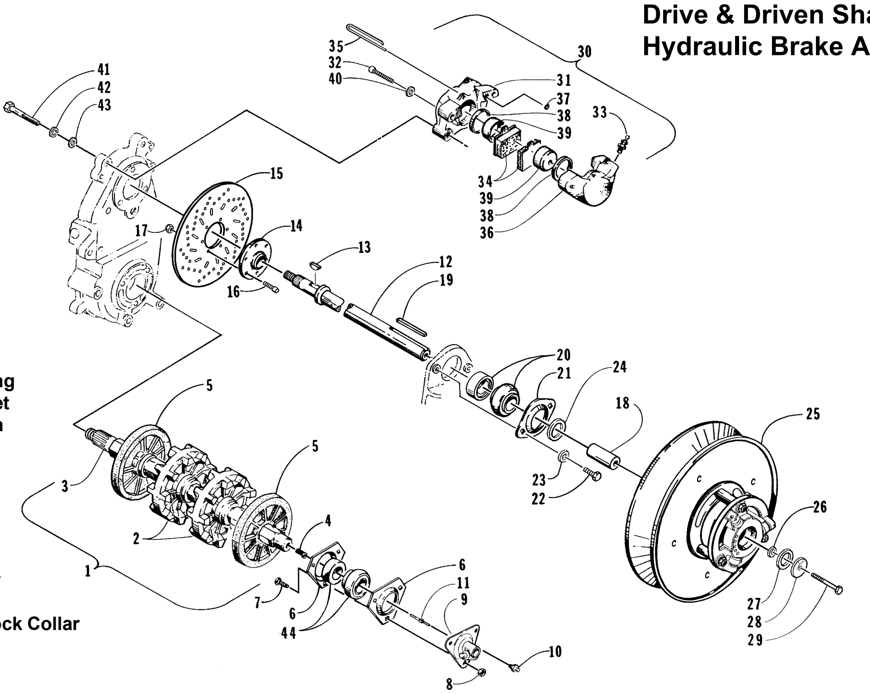


0734-203

8

Fig. 8-74

Drive & Driven Shafts/ Hydraulic Brake Assy



KEY
1. Track Drive Assy
2. Drive Sprocket
3. Driveshaft
4. Drive Bushing
5. Idler
6. Flange Plate
7. Carriage Bolt
8. Lock Nut
9. Drive Adapter
10. Grease Fitting
11. Cable Adapter
12. Driven Shaft
13. Key
14. Hub
15. Disc
16. Cap Screw
17. Lock Nut
18. Stub Shaft
19. Key
20. Bearing
21. Flange Plate
22. Cap Screw
23. Washer
24. Washer
25. Driven Pulley
26. Washer
27. Washer
28. Washer
29. Cap Screw
30. Brake Caliper Assy
31. Housing
32. Cap Screw
33. Bleeder Fitting
34. Brake Pad Set
35. Retaining Pin
36. Housing
37. O-Ring
38. O-Ring
39. Piston
40. Washer
41. Cap Screw
42. Lock Washer
43. Washer
44. Bearing w/Lock Collar

0733-639

Drive Train/Brake Disc (w/Reverse)

DISASSEMBLING

1. Remove the chain-case drain plug located on the lower back side of the chain case inside the tunnel and drain the chain case lubricant.

2. Disconnect the battery cables. Remove the battery and battery tray.

3. Open the belt guard and remove the drive belt.

4. Remove the cap screw and washer securing the driven pulley; then account for and note the position of any alignment washers.

Fig. 8-75

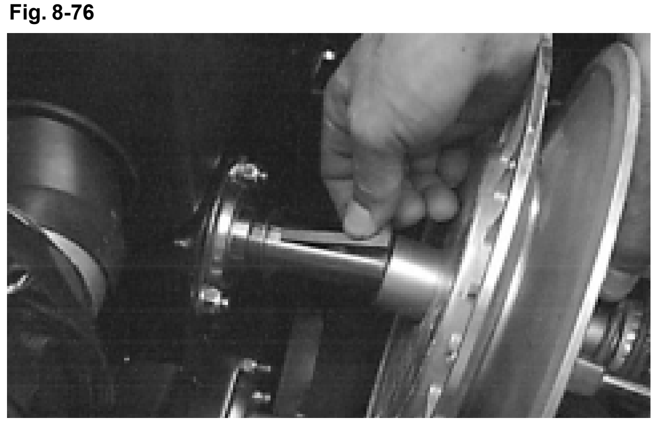


SC013D

5. Slide the driven pulley off the driven shaft; then remove the driven pulley from the engine compartment. Account for the key, stub shaft, and alignment washers.

■ **NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**

Fig. 8-76



AF120D

■ **NOTE: Tip the snowmobile on its left side positioning the chain case side of the snowmobile up. Place a piece of cardboard under the side of the snowmobile to prevent scratching of bumper and belly pan.**

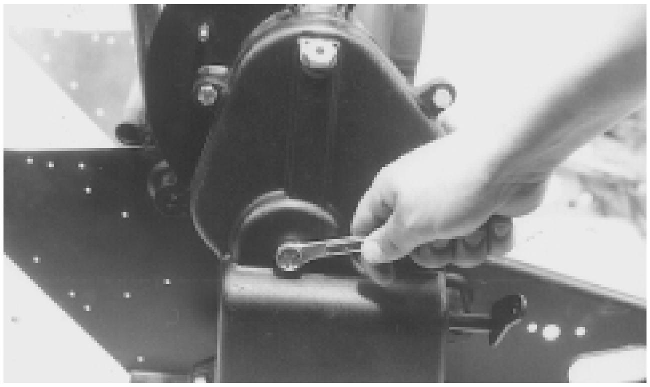
⚠ CAUTION

Before tipping the snowmobile on its side, pull the mirrors close to the hood or damage may occur.

6. Disconnect the shift linkage from the arm on chain case.

7. Remove the cap screw from the center of the chain case.

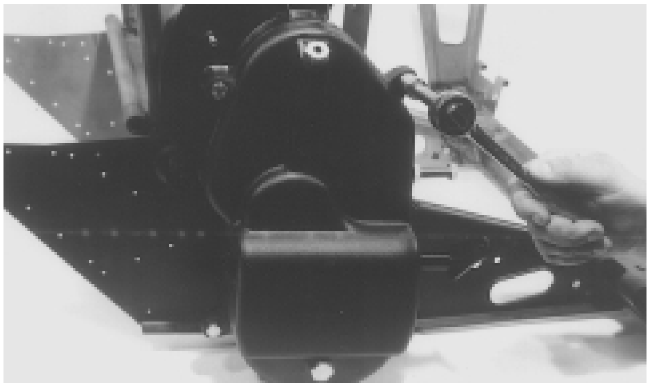
Fig. 8-77



AI025

8. Remove the cap screws securing the chain case cover; then remove the cover by pulling outward and lifting up so the shift fork clears the large inner washer.

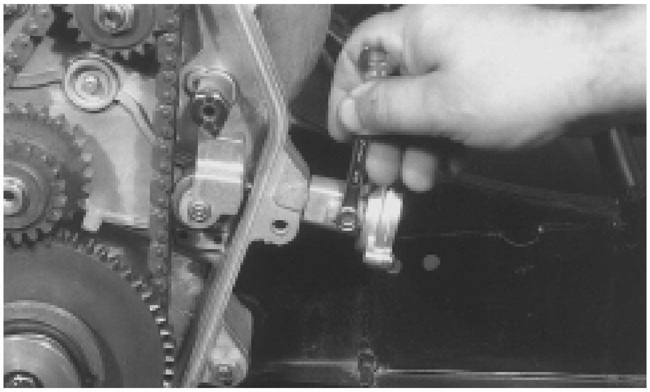
Fig. 8-78



AI010

9. Remove the screw from the chain adjuster housing and install an 8-32 set screw to lock the chain adjuster in position.

Fig. 8-79



AF426

10. Remove the shim washer from the idler sprocket.

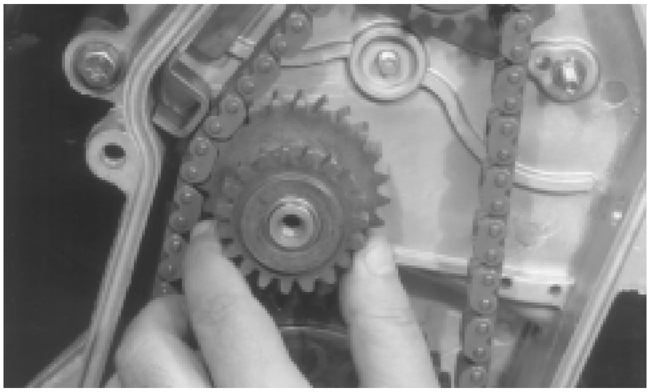
Fig. 8-80



AF436

11. Remove the outer idler sprocket from the shaft.

Fig. 8-81



AF437

12. Slide the small rubber alignment pin from the face of the inner idler sprocket and place in safe location until assembly.

8

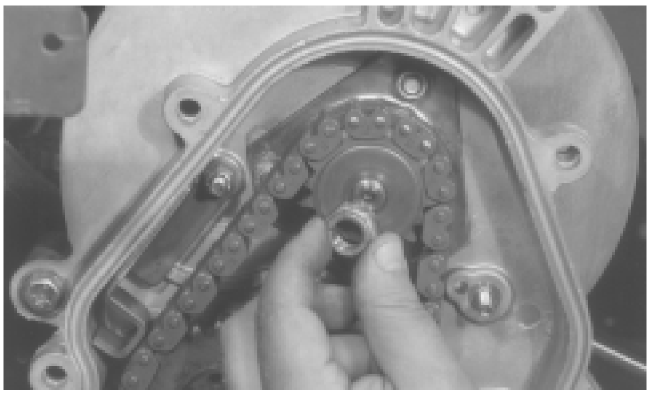
Fig. 8-82



AF439

13. Remove the lock nut securing the top sprocket.

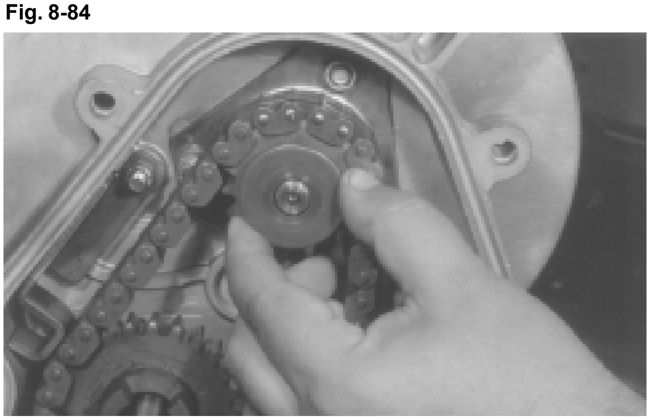
Fig. 8-83



AF432

14. Remove the spring washer in front of the top sprocket.

Fig. 8-84

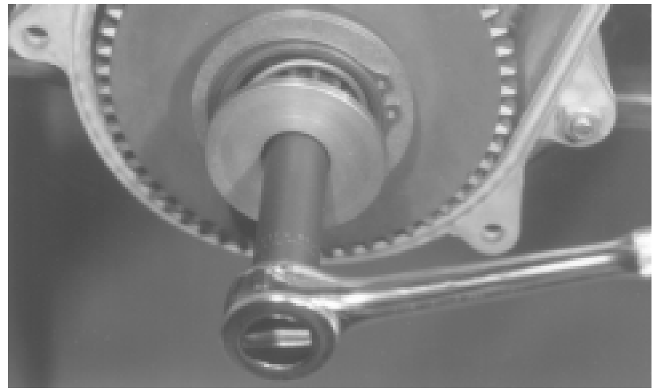


AF444

15. Set the brake lever lock. Remove the cap screw and large washer securing the bottom sprocket.

■ **NOTE: The bottom sprocket cap screw and washer are spring loaded.**

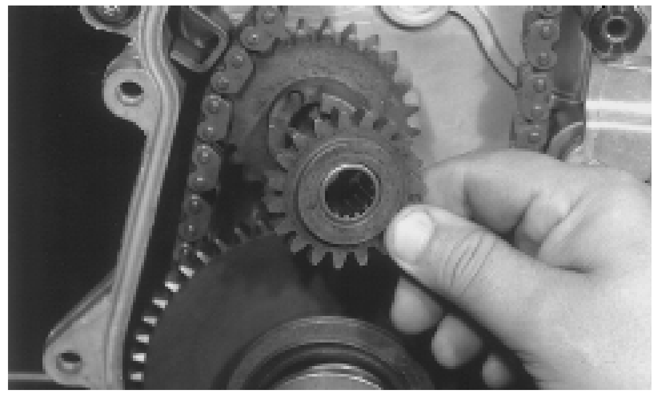
Fig. 8-85



AF428

16. Remove the reverse gear.

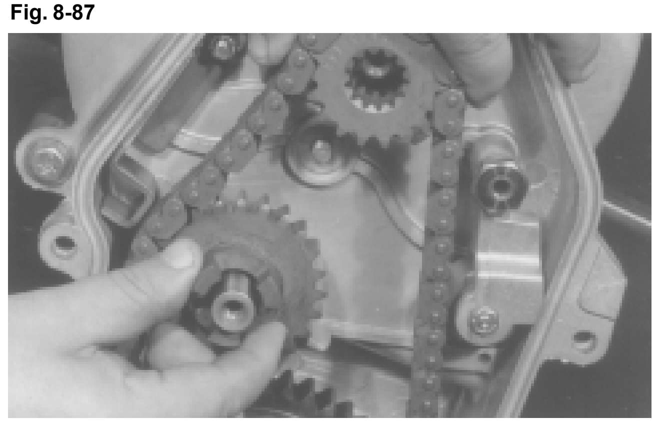
Fig. 8-86



AF442

17. Remove the top sprocket, chain, and idler gear. Account for one shim washer located behind the idler gear.

Fig. 8-87

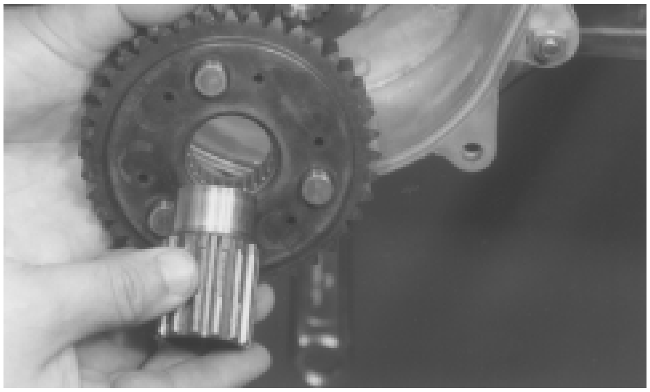


AF433

■ **NOTE: If the chain is too tight and won't allow the top sprocket to be removed, remove the PTO-side driven shaft bearing. This will allow the driven shaft to be lifted at the PTO-side and will loosen the chain.**

18. Remove the driveshaft extension, bottom sprocket, and spacer washer.

Fig. 8-88

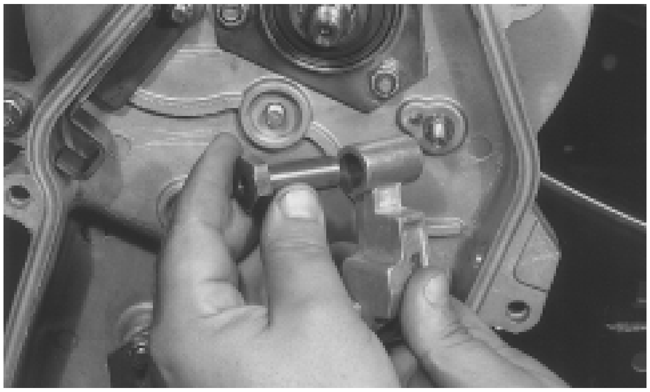


AF427

19. Check the idler gear shaft. If the shaft surface is rough, remove the shaft using a pair of vise-grip pliers. Rotate the shaft counterclockwise.

20. Remove the shoulder nut securing the chain tightener arm; then remove the arm from the chain case.

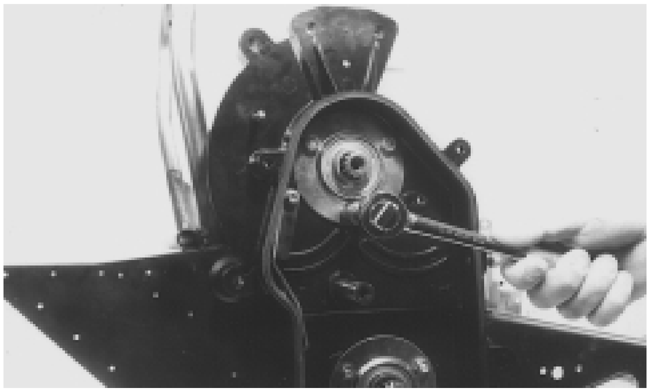
Fig. 8-89



AF447

21. Remove the three lock nuts securing the top bearing flange plate. Remove the flange plate, seal, and bearing.

Fig. 8-90



AI018

22. Remove the three lock nuts securing the bottom bearing flange plate. Remove the flange plate, seal, and bearing.

23. Remove the screw securing the air-intake silencer to the steering support; then pull the silencer forward and place it on the carburetor/throttle body assembly.

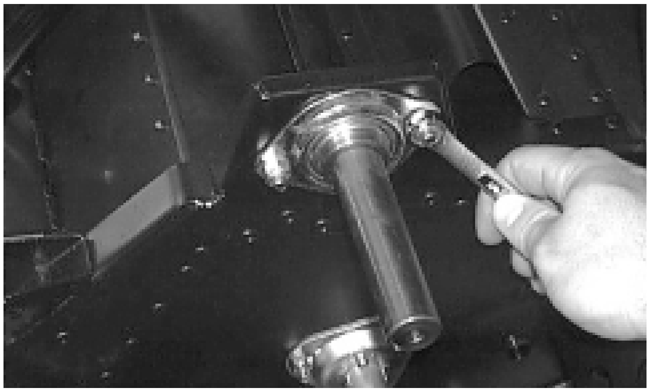
■ **NOTE: Using a hold-down strap, secure the air-intake silencer to the engine.**

24. Loosen the set screw on the PTO-side driven shaft collar. Drive the collar clockwise (opposite shaft rotation) until it is free.

■ **NOTE: A fine file should be used to remove any burrs left by the collar set screw.**

25. Remove the lock nuts and carriage bolts securing the PTO-side driven shaft flange plates.

Fig. 8-91



AF002D

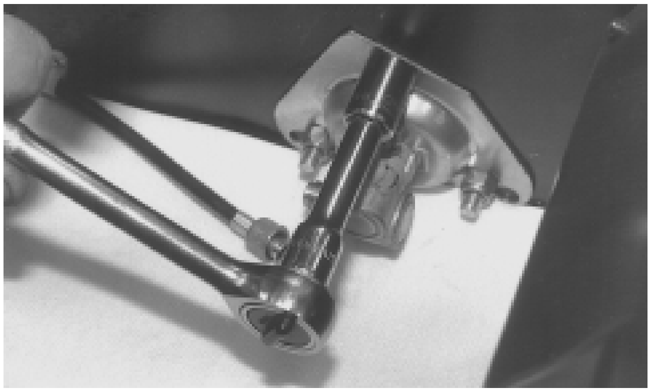
26. Force the driven shaft toward the PTO-side (rotating the shaft to prevent the brake disc from binding on the shaft) until brake disc is free. Account for the key.

27. Continue to slide the driven shaft until it is out of the PTO-side. Account for a bearing, two flange plates, and the PTO-side driven shaft collar.

28. Remove the skid frame from the tunnel (see Section 9).

29. Remove the three PTO-side lock nuts securing the driveshaft flange bearing assembly and cable adapter. Remove the adapter and speedometer cable.

Fig. 8-92



AF053

30. Tap the driveshaft toward the chain case to unseat the MAG-side bearing. Remove the bearing.

31. Slide the driveshaft toward the MAG-side until the PTO-side of the driveshaft is out of its mounting hole. Tilt the end of the driveshaft away from the tunnel and slide the driveshaft free of the tunnel. Remove the track.

Fig. 8-93



AF055

32. Scribe a line on the driveshaft along the edge of each sprocket to aid in assembly. Loosen the set screw on the collar and drive the collar clockwise until free; then remove the bearing and flange plates from the driveshaft.

33. Press the sprockets off the driveshaft.

34. Remove the six socket-head cap screws and lock nuts securing the brake disc to the hub; then separate disc and hub.

Fig. 8-94



AF446

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Thoroughly wash all metallic components in parts-cleaning solvent. Dry using compressed air.

2. Wash all non-metallic components with soap and water.

3. Inspect the driveshaft and driven shaft for damaged splines or stripped threads.

4. Inspect the bearings for any roughness or damage.

5. Inspect the seals for any breaks or damage.

6. Inspect the track for cuts, gouges, or wear.

7. Inspect the keyways in the driven shaft and the brake hub for wear or damage.

8. Inspect the brake disc for wear or cracks.

9. Inspect the track drive sprockets for wear or damage.

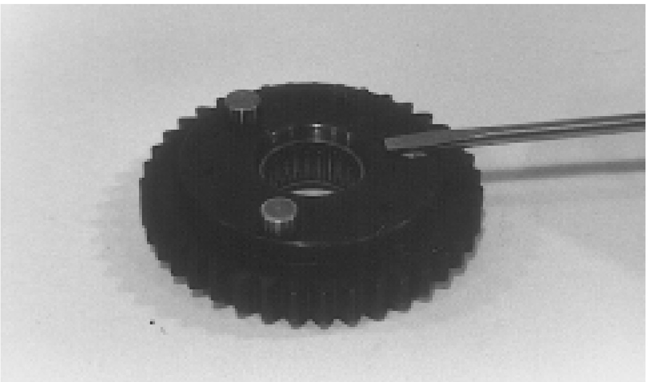
10. Inspect the top sprocket for any chipped or worn teeth.

11. Inspect the bottom sprocket teeth for wear. Turn the inner sprocket bearing by hand and inspect for any signs of being rough.

12. Inspect the three bottom sprocket drive pins. Check the pin edges for chipping and wear.

13. Inspect the drive pin springs for tension by pushing each pin into the sprocket and releasing it. It must snap back out without any signs of binding. If any of these items (pins, bearing, sprocket, teeth) appear worn, replace the sprocket as an assembly.

Fig. 8-95



AI019

14. Inspect the idler gear sprocket teeth and bearings. Rotate the inner bearings by hand. Check each sprocket tooth for any signs of chipping and wear.

15. Closely inspect the drive chain for broken links.

16. Inspect the reverse gear. Inspect the teeth for wear and chipping. Inspect the edges of drive pin holes for any signs of chipping and wear.

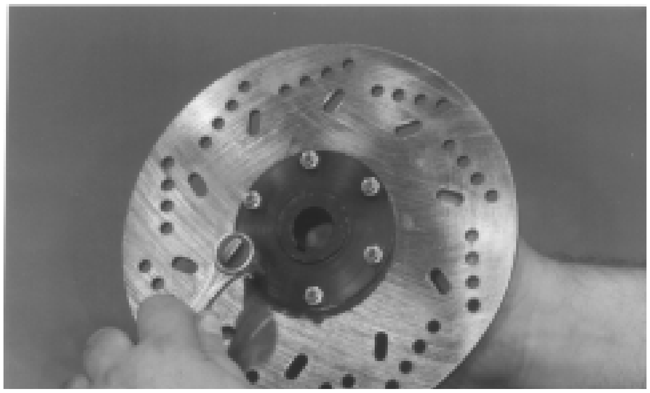
17. Remove the snap ring from the reverse gear. Remove the outer thrust washer, thrust bearing, and inner thrust washer. Inspect the thrust bearing by placing it between the two thrust washers and rotating the thrust washer. Rotation must feel smooth. If any roughness is noted, replace the thrust washers and bearing as a set.

18. Inspect the chain tightener bearing. Rotate the tightener roller and check for smooth rotation. If rotation feels rough, replace roller and bearing assembly.

ASSEMBLING

1. Secure the hub to the brake disc with six socket-head cap screws (coated with red Loctite #271) and lock nuts. Tighten lock nuts to 0.4 kg-m (36 in.-lb).

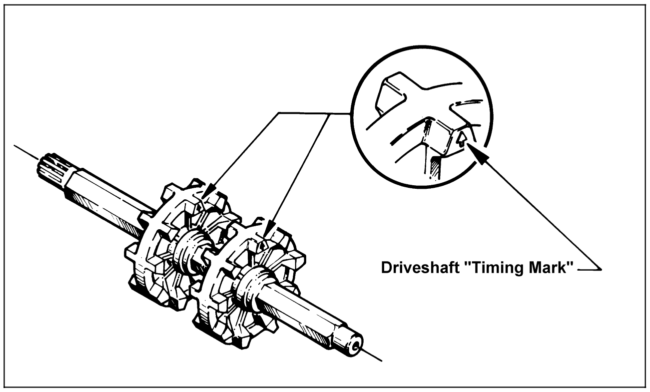
Fig. 8-96



AF445

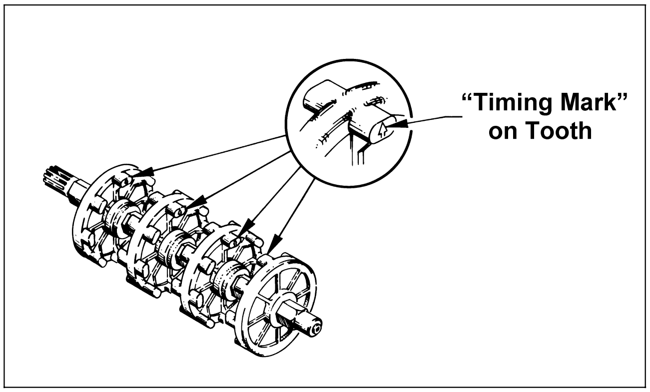
2. Press the sprockets on the driveshaft noting the scribed marks on the shaft and the timing mark found on one tooth of each sprocket. The timing mark is the letter T molded into the outer surface of one drive tooth. All the T markings must be in alignment.

Fig. 8-97



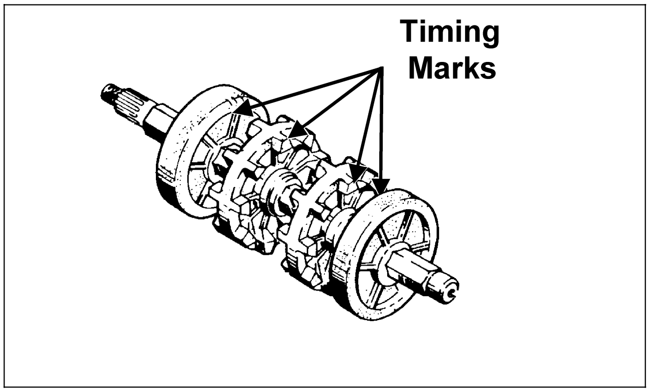
0728-351

Fig. 8-98



0727-829

Fig. 8-99

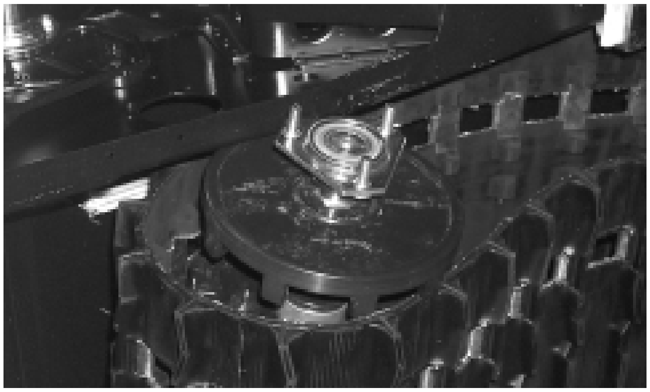


727-829A

■ **NOTE: Make sure all sprockets are installed correctly to ensure correct timing of the sprockets. The bearing is positioned between the flange plates.**

3. Assemble the driveshaft components on the PTO-side of the driveshaft. Install the bearing lock collar; then install the flange bearing assembly with the bolts facing towards the tunnel.

Fig. 8-100



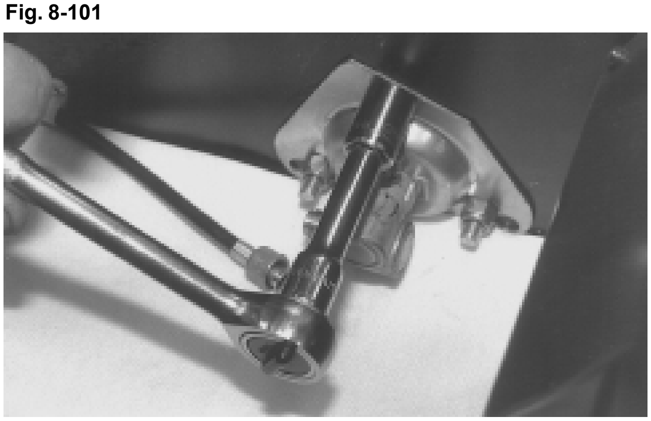
AF055

4. Position the front of the track up into the tunnel. Install the driveshaft with the splined end through its mounting hole in the chain case.

5. Place the PTO-side of the driveshaft into position by sliding the bolts of the flange bearing assembly through the holes in the tunnel.

6. Place the cable adapter into position on the flange bearing assembly bolts. Secure with three lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).

Fig. 8-101



AF053

7. Slide the MAG-side bearing onto the driveshaft (inner race flange must be positioned toward drive chain); then install the seal and flange plate. Secure with three carriage bolts and lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).

8. Install the brake hub key into the driven shaft keyway; then slide the brake disc into position on the splined end of the driven shaft.

9. Install the PTO-side bearing with collar and flange plates on the driven shaft; do not tighten the collar at this time. Place the driven shaft into position making sure the brake disc and flange plates are properly positioned. Secure the PTO-side bearing and flange plates with two carriage bolts and lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).

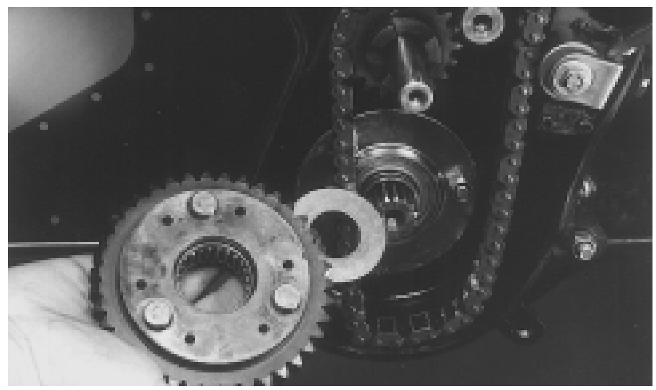
10. On the MAG-side driven shaft, apply Scotchbond Adhesive 4174 to the bearing seating area adjacent to the shaft splines. Install the bearing, seal, and flange plate. Secure with three lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).

⚠ CAUTION
Tighten the flange plate nuts evenly or the O-ring seal may be damaged.

■ **NOTE: If washers were removed from behind the upper sprocket, install them at this time.**

11. Install the spacer washer on the driveshaft.

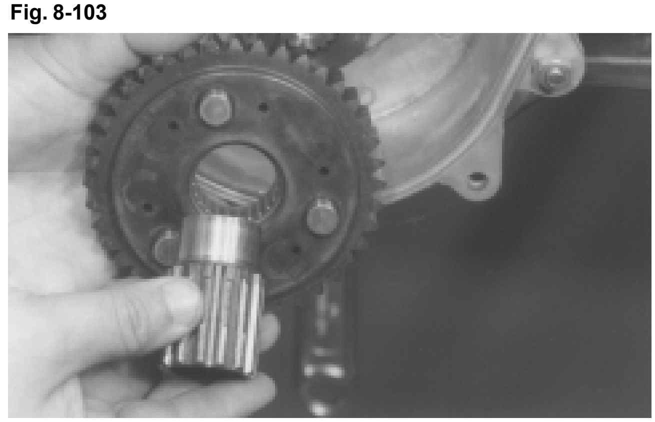
Fig. 8-102



AF090

12. Install the bottom sprocket and driveshaft extension.

Fig. 8-103



AF427

13. Position one shim washer on the idler gear shaft.

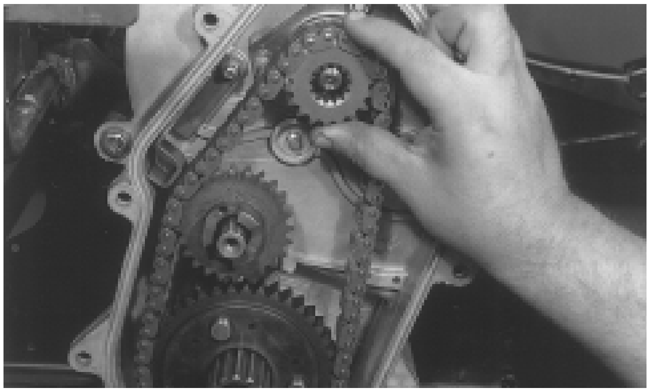
Fig. 8-104



AF430

14. Position the chain around the lower reverse sprocket; then place the idler sprocket and top sprocket into the chain. Slide sprockets into position on the idler shaft and driven shaft.

Fig. 8-105

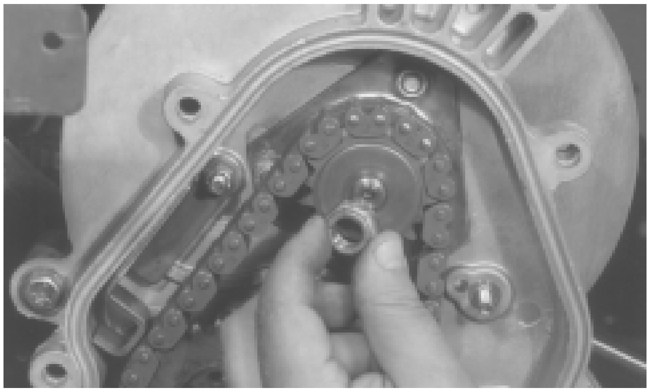


AF441

■ **NOTE: If the chain tension is too tight to allow installation of the top sprocket, remove the PTO-side driven shaft bearing. This will allow the driven shaft to be lifted at the PTO-side and will allow the sprocket to slide onto the splined end of the driven shaft.**

15. Secure the top sprocket with a spring washer (with the high side directed away from the sprocket) and lock nut (coated with red Loctite #271). Tighten the lock nut to 4.8-5.5 kg-m (35-40 ft-lb).

Fig. 8-106



AF432

■ **NOTE: If the PTO-side driven shaft bearing was removed to make the sprocket installation easier, install the bearing and flange plate. Lock the bearing collar by driving it in the direction of rotation to lock the collar to the bearing and shaft. Tighten the collar set screw.**

16. Place the rubber alignment pin into position in the idler sprocket; then slide the outer idler gear on the shaft. Install shim washer on the shaft.

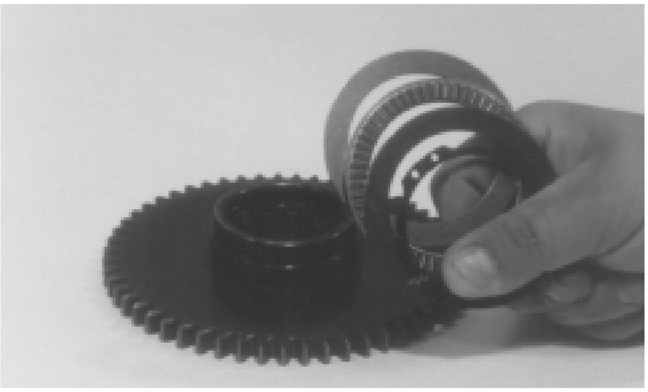
Fig. 8-107



AF436

17. If the lower reverse sprocket was disassembled, assemble the thrust washer, bearing, and thrust washer. Secure with the snap ring. Apply transmission lube to the bearing and rotate by hand.

Fig. 8-108

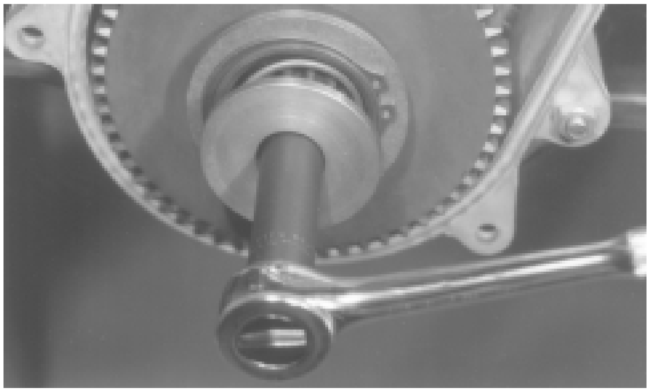


AI021

18. Slide the reverse gear onto the driveshaft extension; then position the spring into the reverse gear and secure with heavy washer and cap screw. Tighten to 2.6-3.3 kg-m (19-24 ft-lb).

8

Fig. 8-109



AF428

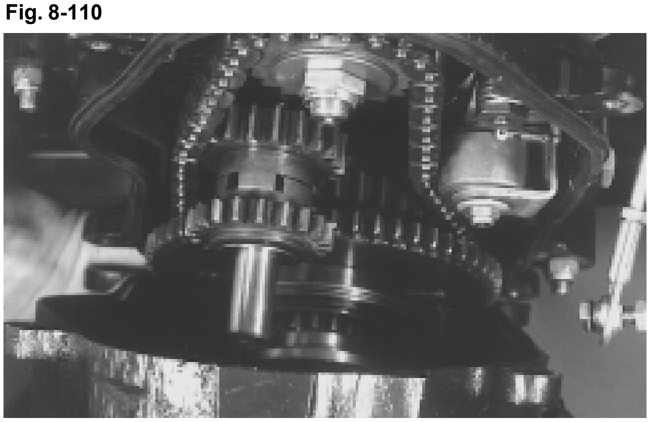
19. Install the chain tensioner arm, apply blue Loctite #242 to the stud threads, and tighten the shoulder nut to 0.6-0.7 kg-m (4-5 ft-lb).

20. Remove the set screw from the chain adjuster housing and install the adjuster plug.

21. Check that the chain-case O-ring seal is positioned correctly on the housing.

22. Position the shift fork behind the large thrust washer and bearing on the reverse gear; then position the cover on the housing.

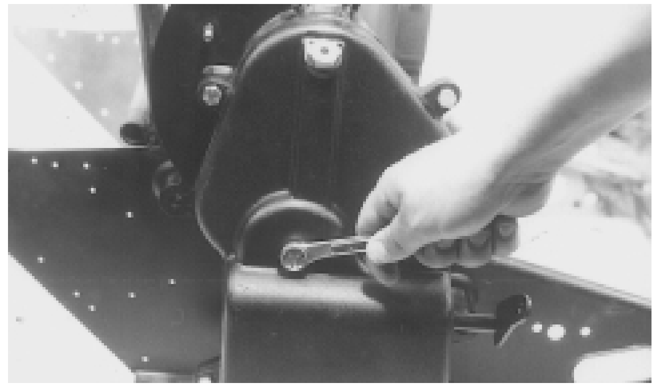
Fig. 8-110



AF075

23. Apply blue Loctite #242 to the threads of the cap screw; then install the cap screw through the center of the cover and into the idler shaft. Tighten the cap screw enough to draw the idler shaft into the cover.

Fig. 8-111



AI025

24. Place the shift pivot and reverse switch bracket into position on the cover; then secure the chain- case cover with cap screws and lock washers. Tighten the cap screws to 1.7-2.1 kg-m (12-15 ft-lb).

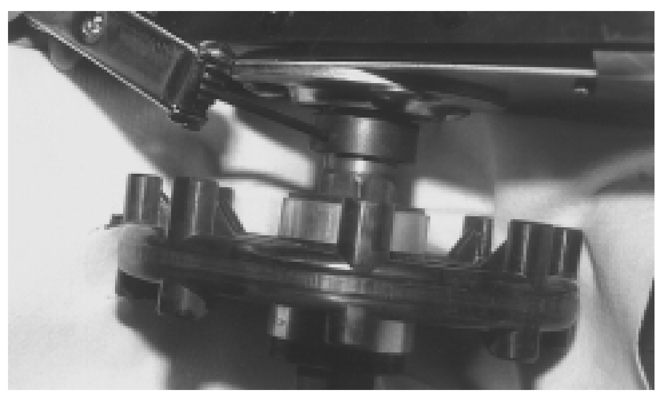
25. Place the shift linkage into position on the back side of the arm and secure with a cap screw and lock nut. Tighten to 1.7-2.1 kg-m (12-15 ft-lb).

26. Place the reverse lever into position on the shift pivot and secure with a clevis pin and cotter pin.

27. Secure the chain-case cover with cap screws and lock washers. Tighten the cap screws to 1.7-2.1 kg-m (12-15 ft-lb).

28. On the PTO-side of the track driveshaft, slide the lock collar against the bearing, drive the collar in the direction of rotation until tight, and tighten the collar set screw.

Fig. 8-112



AF054

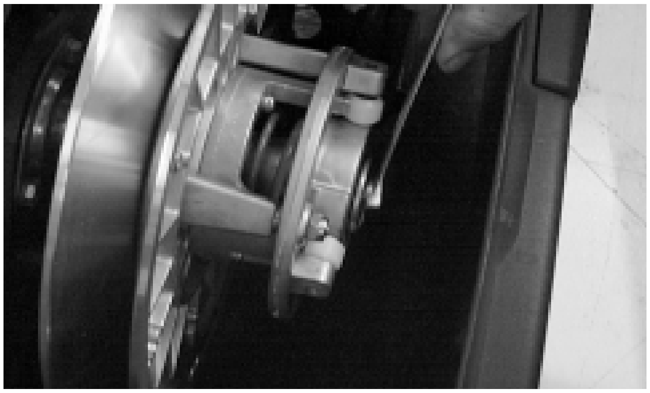
29. Install the skid frame (see Section 9).

30. Remove the hold-down strap securing the air-intake silencer; then place the silencer into position making sure the boot is properly positioned on the carburetor/throttle body assembly. Secure the silencer to the steering support with the two screws.

31. Apply a light coat of grease or Loctite Anti-Seize Thread Compound (p/n 0678-146) to the driven shaft; then install the driven shaft alignment washers (as required) and key. Install the stub shaft and the driven pulley, alignment washers (as required), washer, and cap screw. Tighten to 2.6-3.3 kg-m (19-24 ft-lb).

■ **NOTE: Make sure the keyways match when installing the driven pulley. Arrange washers to allow the least amount of "float" on the driven shaft. A maximum of 1.5 mm (0.060 in.) "float" is allowable.**

Fig. 8-113



SC013D

32. Check the alignment of the drive clutch/driven pulley (see Drive Clutch/Driven Pulley in this section).

33. Assure that the chain case drain plug is tightened to 4.8 kg-m (35 ft-lb); then pour 354 ml (12 fl oz) of Arctic Cat Transmission Lube (p/n 0636-817) into the chain case.

34. Install the drive belt and check belt deflection. Secure the belt guard.

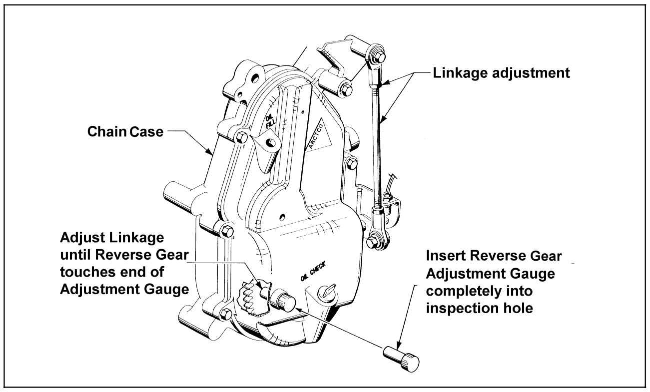
35. Install and secure the battery tray and battery; then connect the battery cables making sure to connect the positive cable first.

ADJUSTING REVERSE LINKAGE

1. Start the engine; then test the shifting characteristics of the reverse transmission.

2. If adjustment of the reverse gear is necessary, stop the engine and remove the chain case inspection plug located behind the oil level stick; then insert the Reverse Gear Adjustment Gauge (p/n 0644-244) completely into the inspection hole.

Fig. 8-114



0731-734

3. Pull the shift lever into the reverse position while holding the adjustment gauge firmly against the chain case cover. Slight outward pressure should be felt on the gauge as the lever locks into reverse.

4. If no contact is noted, loosen the jam nuts securing the lower shift linkage and adjust the linkage rod until the gauge is pushed out of the chain case 0.254-0.381 mm (0.010-0.015 in.). Lock the adjustment by tightening the jam nuts securely against the tie rod ends.

■ **NOTE: To adjust the linkage rod, the shift lever must be moved to the forward position.**

5. Install the inspection plug.

6. Start the engine; then test the shifting characteristics of the reverse transmission. Adjust as necessary.

⚠ CAUTION

The linkage must be properly adjusted. If the linkage is too short, damage to the shift fork may occur. If the linkage is adjusted too long, the gears will not shift totally into reverse.

8

Drive Train/Brake Disc
(W/O Reverse)

DISASSEMBLING

1. Remove the chain-case drain plug (located on the lower back side of the chain case inside the tunnel) and drain the chain case lubricant.

2. Open the belt guard and remove the drive belt.

3. Remove the cap screw and washer securing the driven pulley; then account for and note the position of any alignment washers.

Fig. 8-115



SC013D

4. Slide the driven pulley off the driven shaft; then remove the driven pulley from the engine compartment. Account for the stub shaft, key, and alignment washers.

■ **NOTE: If the driven pulley is tight on the driven shaft, pull the driven pulley off using the Driven Pulley Puller (p/n 0744-023).**

Fig. 8-116



AF120D

5. Remove the cap screws and lock washers securing the chain-case cover; then remove the cover.

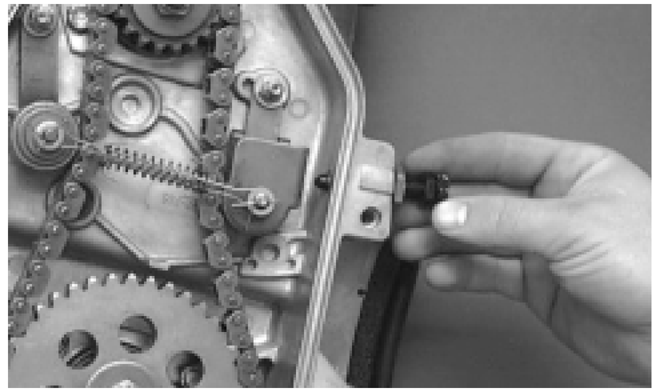
Fig. 8-117



AF111D

6. Loosen the mechanical chain tensioner bolt; then remove the cotter pins and washers securing the tensioner spring to the link pins. Remove the spring, rollers, and washers.

Fig. 8-118

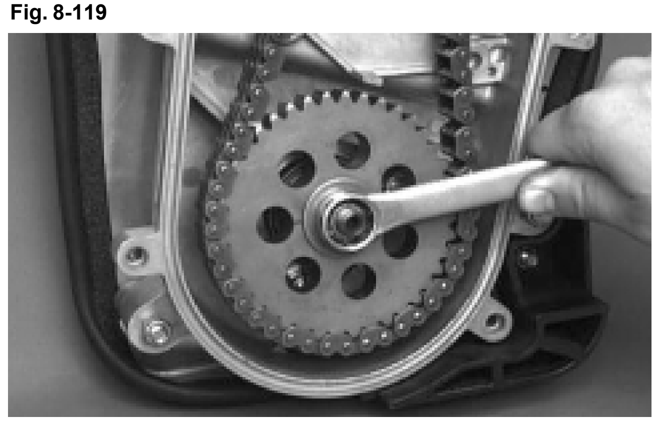


AF347D

7. Remove the flex nut securing the front roller cage and roller. Remove the cage and roller.

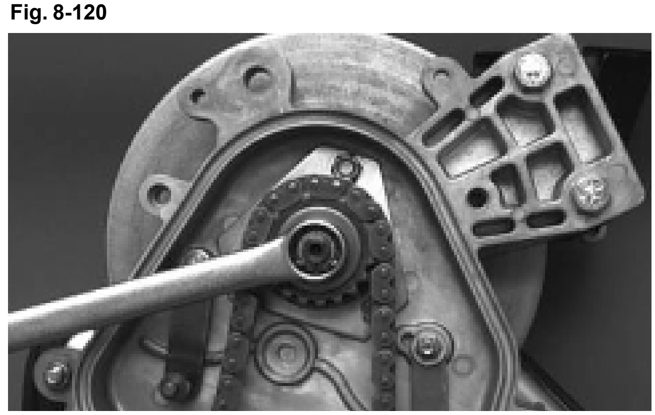
8. Set the brake lever lock; then remove the lock nut and spring washer securing the bottom sprocket and the lock nut and spring washer securing the top sprocket.

Fig. 8-119



AF345D

Fig. 8-120



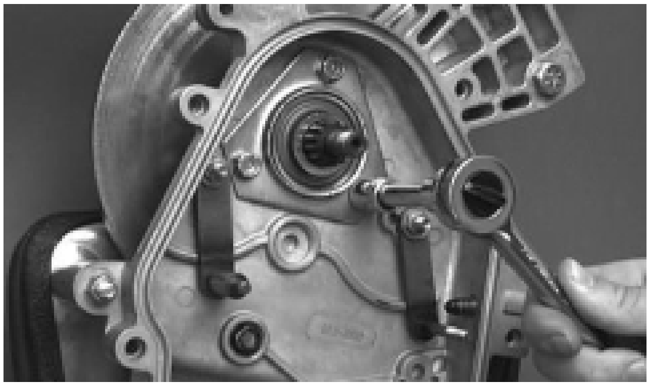
AF344D

9. Slide both sprockets with chain off the shafts. Account for washer(s) behind the top sprocket. Release the brake lever lock.

■ **NOTE: If a sprocket will not slide off the shaft, thread the nut onto the shaft; then use a puller to loosen the sprocket. The nut will prevent damage to the threads.**

10. Remove the six lock nuts securing the top and bottom chain case flange plates. Remove the flange plates, seals, and bearings.

Fig. 8-121



AF116D

11. Remove the screws securing the air-intake silencer to the steering support; then pull the silencer forward and place it on the carburetors/throttle body.

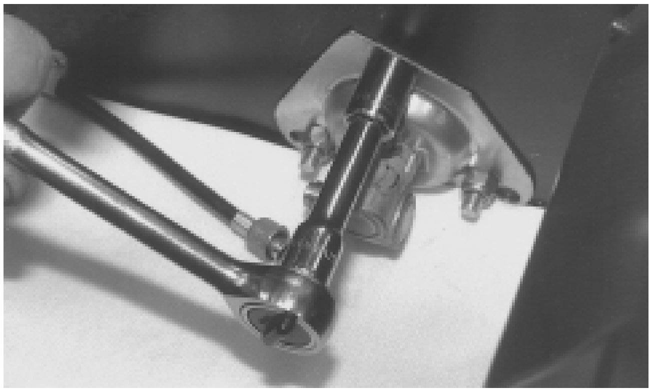
■ **NOTE: Using a hold-down strap, secure the air-intake silencer to the engine.**

12. Loosen the set screw on the PTO-side driven shaft collar. Drive the collar clockwise (opposite shaft rotation) until it is free.

■ **NOTE: A fine file should be used to remove any burrs left by the collar set screw.**

13. Remove the two lock nuts and carriage bolts securing the PTO-side driven shaft flange plate.
14. Force the driven shaft toward the PTO-side (rotating the shaft to prevent the brake disc from binding on the shaft) until the brake disc is free. Account for the key.
15. Continue to slide the driven shaft until it is out of the PTO-side. Account for a bearing, flange plate, and the PTO-side driven shaft collar.
16. Remove the skid frame from the tunnel (see Section 9).
17. Remove the three PTO-side lock nuts securing the driveshaft flange bearing assembly and the speedometer cable adapter. Remove the cable adapter and speedometer cable.

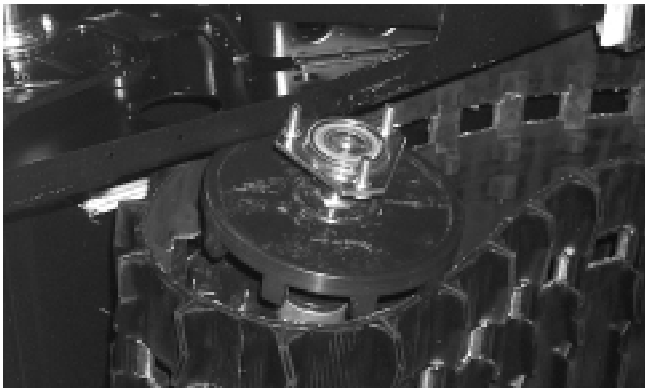
Fig. 8-122



AF053

18. Tap the driveshaft toward the chain case to unseat the MAG-side bearing. Remove the bearing.
19. Slide the driveshaft toward the MAG-side until the PTO-end of the driveshaft is out of its mounting hole. Tilt the end of the driveshaft away from the tunnel and slide the driveshaft free of the tunnel. Remove the track.

Fig. 8-123



AF055

20. Scribe a line on the driveshaft along the edge of each sprocket to aid in assembly. Loosen the set screw on the collar and drive the collar clockwise until free; then remove the bearing and flange plates from the driveshaft.
21. Press the sprockets off the driveshaft.
22. Remove the six socket-head cap screws and lock nuts securing the brake disc to the hub; then separate disc and hub.

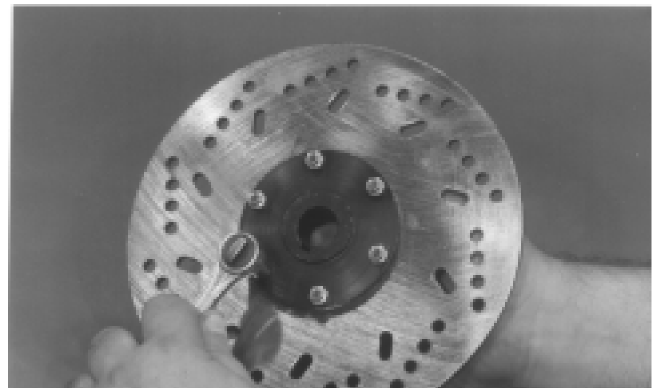
8

Fig. 8-124



AF446

Fig. 8-125



AF445

CLEANING AND INSPECTING

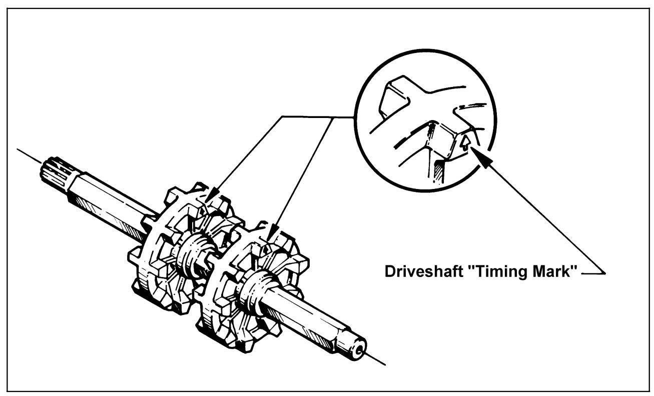
■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Thoroughly wash all metallic components in parts-cleaning solvent. Dry using compressed air.
2. Wash all non-metallic components with soap and water.
3. Inspect the driveshaft and driven shaft for damaged splines or stripped threads.
4. Inspect the bearings for any roughness or damage.
5. Inspect the seals for any breaks or damage.
6. Inspect the track for cuts, gouges, or wear.
7. Inspect the keyways in the driven shaft and the brake hub for wear or damage.
8. Inspect the brake disc for wear or cracks.
9. Inspect the chain, sprockets, and chain tensioner components for wear or damage.
10. Inspect the track drive sprockets for wear or damage.

ASSEMBLING

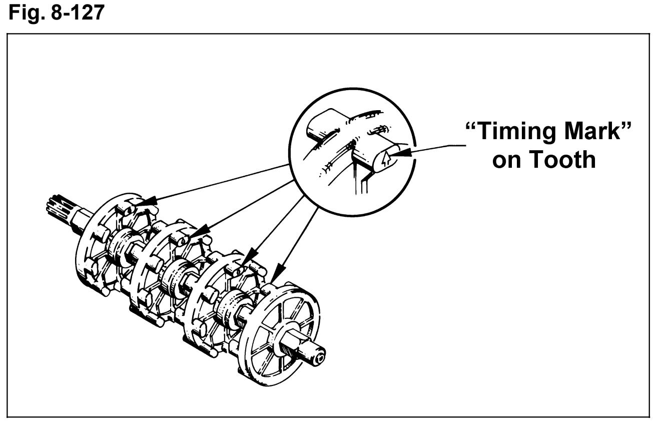
1. Secure the hub to the brake disc with the six socket-head cap screws and lock nuts. Tighten the lock nuts to 0.4 kg-m (36 in.-lb).
2. Press the sprockets on the driveshaft noting the scribed marks on the shaft and the timing mark found on one tooth of each sprocket. The timing mark is the letter T molded into the outer surface of one drive tooth of the inside sprockets and on the inside surface of the outside sprockets. All the T markings must be in alignment.

Fig. 8-126



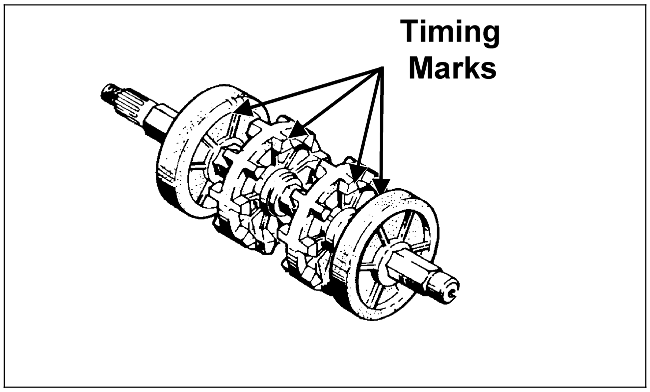
0728-351

Fig. 8-127



0727-829

Fig. 8-128



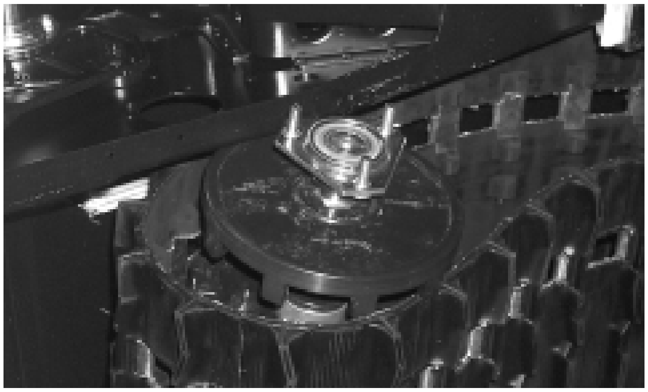
727-829A

■ **NOTE: Make sure the sprockets are installed correctly and the bearing is positioned between the flange plates ensuring correct timing of the sprockets.**

3. Assemble the driveshaft components on the PTO-end of the driveshaft. Install the bearing lock collar; then install the flange bearing assembly with the bolts facing towards the tunnel.

4. Position the front of the track into the tunnel. Install the driveshaft with the splined end through its mounting hole in the chain case.

Fig. 8-129

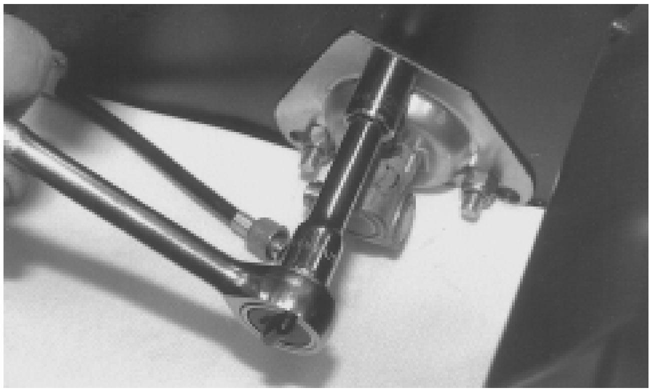


AF055

5. Place the PTO-end of the driveshaft into position by sliding the bolts of the flange bearing assembly through the holes in the tunnel.

6. Place the cable adapter into position on the flange bearing assembly bolts. Secure with three lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).

Fig. 8-130



AF053

7. Slide the MAG-side bearing onto the driveshaft (inner race flange must be positioned toward drive chain); then install the O-ring seal and flange plate. Insert the cap screws from the inside of the tunnel through the chain case, seal, and flange. Secure with three lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).

8. Place the bottom sprocket onto the splines. Finger-tighten a lock nut (threads coated with blue Loctite #242) and spring washer. DO NOT TIGHTEN AT THIS TIME.

9. Install the brake hub key into the driven shaft keyway.

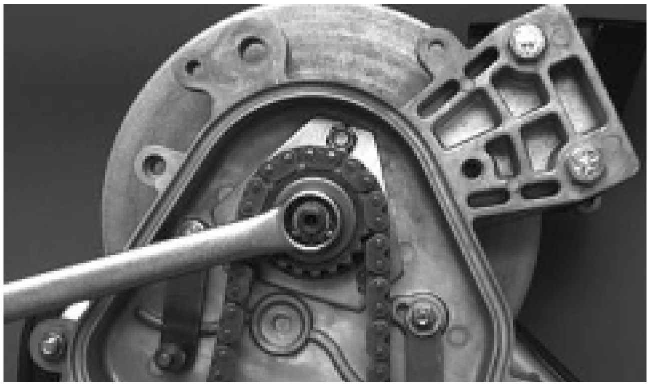
10. Install the PTO-side bearing with collar and flange plate on the driven shaft; do not tighten the collar at this time. Place the driven shaft into position making sure the brake disc and flange plate are properly positioned. Secure the PTO-side bearing and flange plate with two carriage bolts and lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).

11. On the MAG-side of the driven shaft, apply Scotch Bond Adhesive #4174 to the bearing seating area adjacent to the shaft splines. Install the bearing, seal, and flange plate. Secure with three lock nuts. Tighten to 2.2-2.5 kg-m (16-18 ft-lb).

■ **NOTE: If washers were removed from behind the top sprocket; install them at this time.**

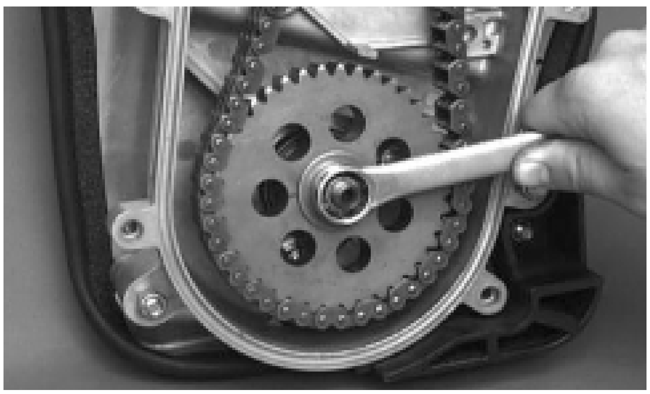
12. Loop the chain around the bottom sprocket and slide the top sprocket with chain onto the driven shaft. Secure the top sprocket with a lock nut (threads coated with blue Loctite #242) and spring washer. Tighten to 4.8-5.5 kg-m (35-40 ft-lb). Tighten the bottom sprocket lock nut to 4.8-5.5 kg-m (35-40 ft-lb).

Fig. 8-131



AF344D

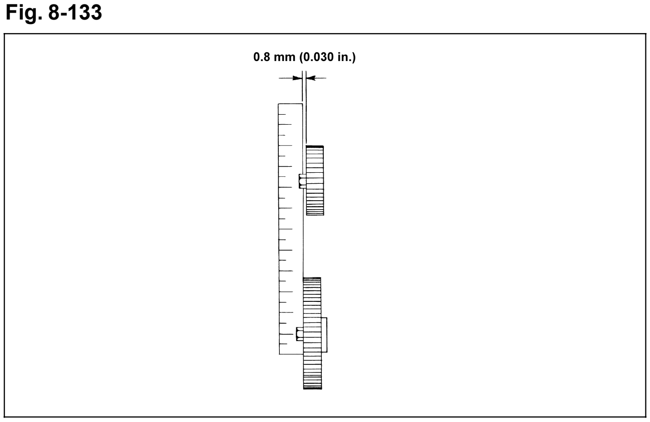
Fig. 8-132



AF345D

13. Check the alignment of the sprockets using the following procedure.
    a. Place a straightedge against the faces of the sprockets.
    b. Using a feeler gauge, check for clearance along the faces of both sprockets. If clearance exceeds 0.8 mm (0.030 in.), shimming is necessary.

Fig. 8-133

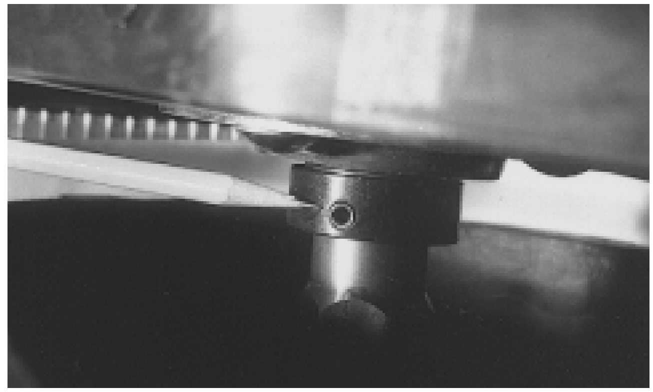


0725-171

■ **NOTE: Sprockets can only be shimmed out.**

14. On the PTO-side of the track driveshaft, slide the lock collar against the bearing, drive the collar in the direction of rotation until tight, and tighten the collar set screw to 0.4 kg-m (36 in.-lb).

Fig. 8-134

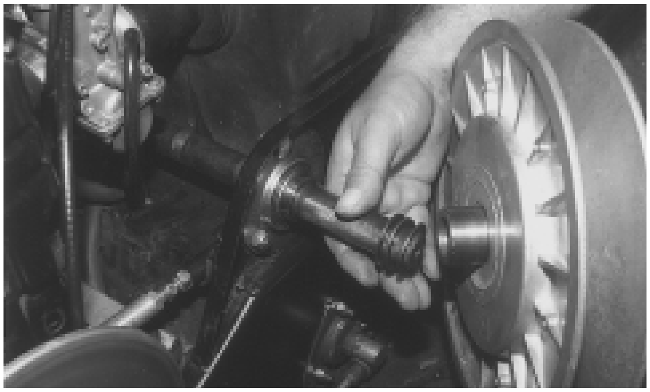


AF058

15. Install the skid frame (see Section 9).
16. Remove the hold-down strap securing the air-intake silencer; then place the silencer into position making sure the boot is properly positioned on the carburetors/throttle body.
17. Secure the silencer to the steering support with the two screws.
18. Apply a light coat of grease or Loctite Anti-Seize Thread Compound (p/n 0678-146) to the driven shaft; then install the driven shaft alignment washers (as required) and key. Install the driven pulley, stub shaft, alignment washers (as required), washer, and cap screw. Tighten the cap screw to 2.6-3.3 kg-m (19-24 ft-lb).

■ **NOTE: Make sure keyways match when installing the driven pulley. Arrange washers to allow the least amount of "float" on the driven shaft. A maximum of 1.5 mm (0.060 in.) "float" is allowable.**

Fig. 8-135

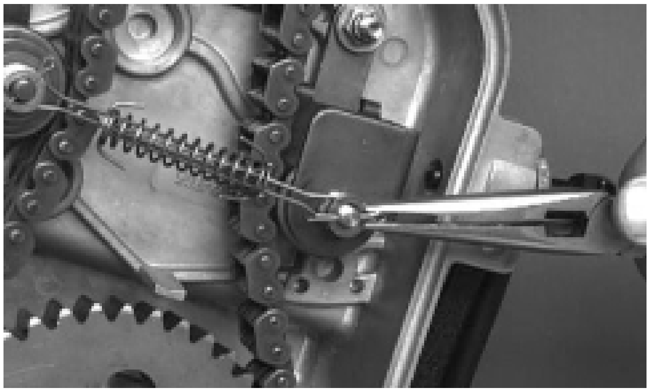


AF057

19. Check the alignment of the drive clutch/driven pulley (see Drive Clutch/Driven Pulley in this section).

20. Tip the snowmobile onto the PTO-side using cardboard to prevent scratching the belly pan; then install the washers, rollers, and spring. Secure with two washers and cotter pins.

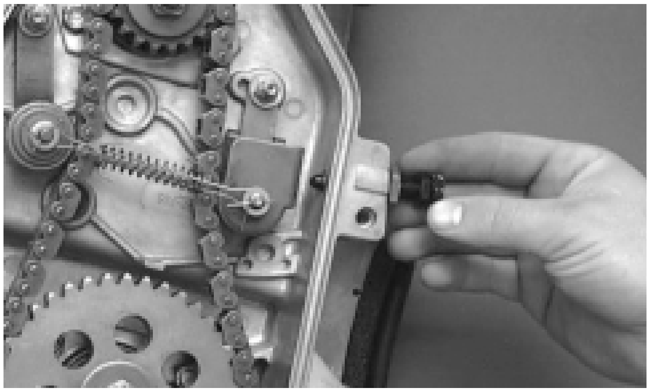
Fig. 8-136



AF113D

21. Tighten the mechanical chain tensioner finger-tight; then lock the jam nut against the chain case.

Fig. 8-137



AF347D

22. Place the front roller cage and roller into position and secure with the flex lock nut.

23. Install the drain plug and tighten to 4.8 kg-m (35 ft-lb); then pour 236 ml (8 fl oz) of Arctic Cat Transmission Lube (p/n 0636-817) into the chain case.

24. Check the position of the chain-case cover O-ring seal; then place the chain-case cover into position and secure with six cap screws and lock washers. Tighten to 1.7-2.1 kg-m (12-15 ft-lb).

Fig. 8-138



AF111D

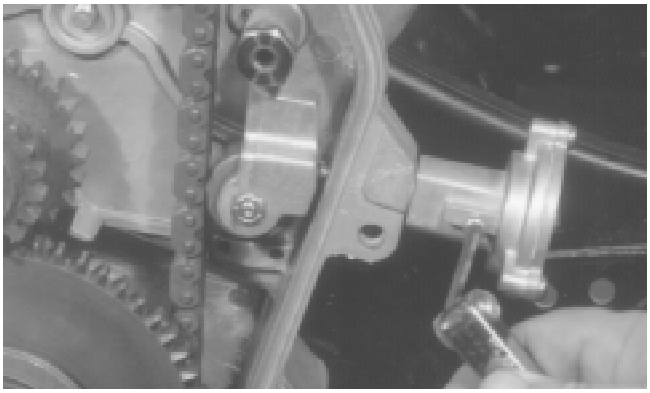
25. Install the drive belt and check drive belt deflection (see Drive Clutch/Driven Pulley in this section). Secure the belt guard.

Chain Adjuster

REMOVING AND DISASSEMBLING

1. Remove the small plug from the adjuster housing and install an 8-32 set screw into the threaded hole of the adjuster housing.

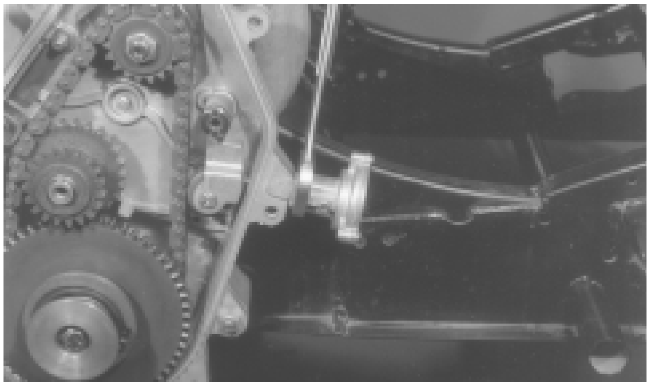
Fig. 8-139



AF416

2. Using a 3/4-in. wrench, remove the chain adjuster from the chain case.

Fig. 8-140



AF417

3. Remove the adjuster stem from the end of the adjuster screw.

Fig. 8-141



AF418

4. Using a small piece of wire, remove the small spring from the end of the adjuster screw.

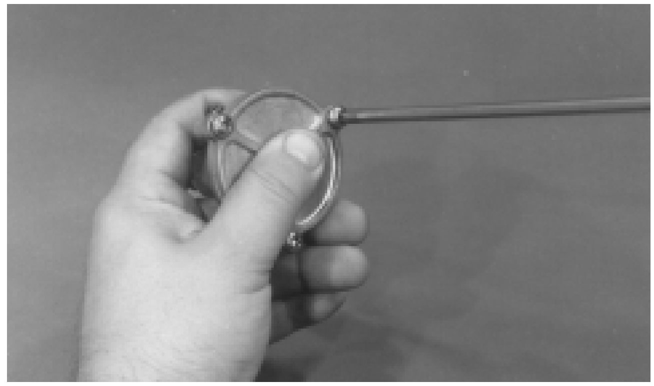
Fig. 8-142



AF401

5. While holding the end cap in position, remove the three cap screws securing the end cap to the adjuster housing.

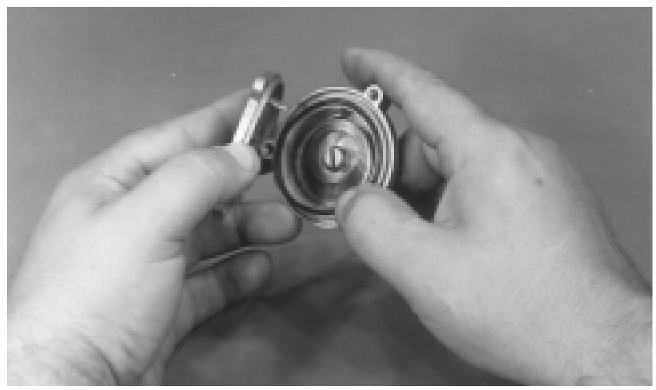
Fig. 8-143



AF419

6. Slowly and carefully lift the end cap from the adjuster housing until it is free of the hooked end of the spring.

Fig. 8-144

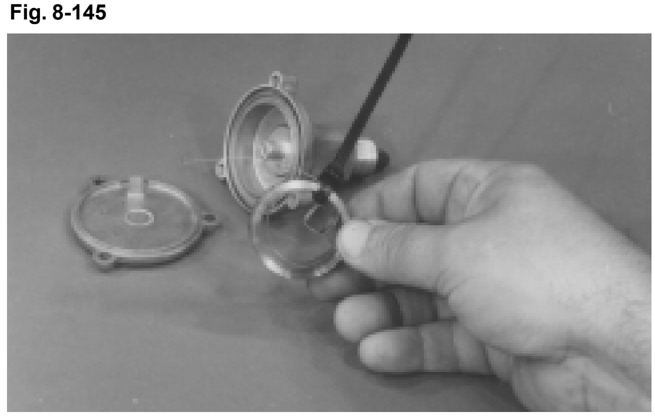


AF420

7. Remove the O-ring seal from the adjuster housing.

8. Carefully lift the spring from the housing and secure the spring using a cable tie.

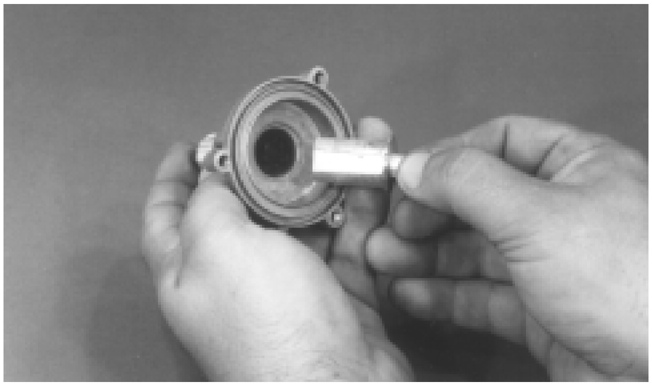
Fig. 8-145



AF421

9. Remove the set screw from the adjuster housing; then remove the adjuster socket from the housing by pulling it free of the adjuster bolt.

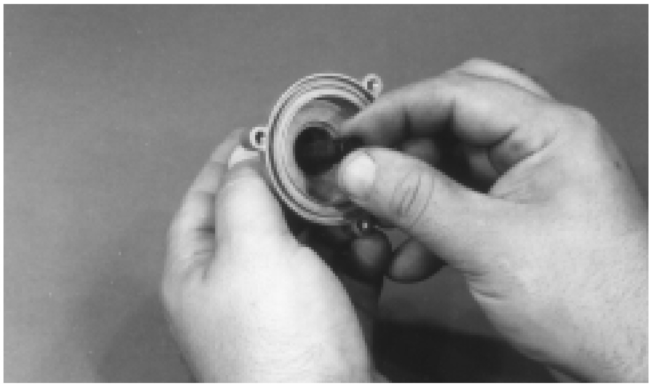
Fig. 8-146



AF422

10. Rotate the adjuster bolt counterclockwise until it is free of the housing; then remove the adjuster bolt.

Fig. 8-147



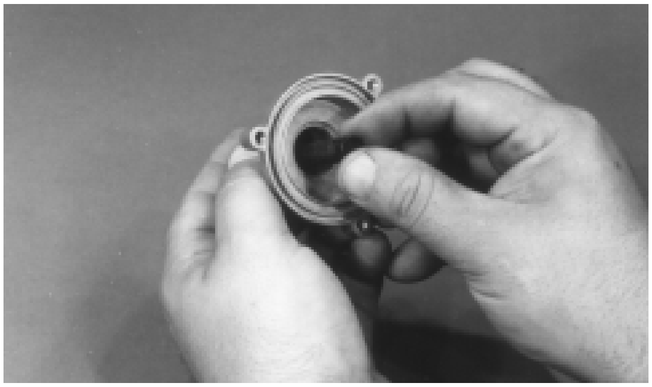
AF423

11. Wash all components in parts-cleaning solvent and inspect all components for any signs of wear.

ASSEMBLING AND INSTALLING

1. Apply a light coat of oil to the threads of the adjuster bolt; then turn the adjuster bolt clockwise into the housing a few turns.

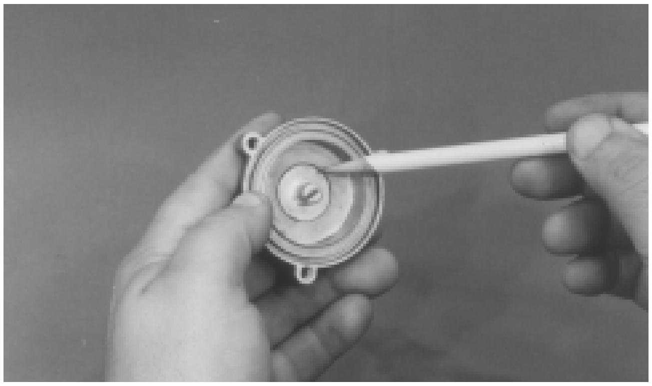
Fig. 8-148



AF423

2. Slide the adjuster socket over the end of the adjuster bolt and push the socket down firmly into position. Rotate the adjuster socket clockwise until its flange seats against the housing inner surface.

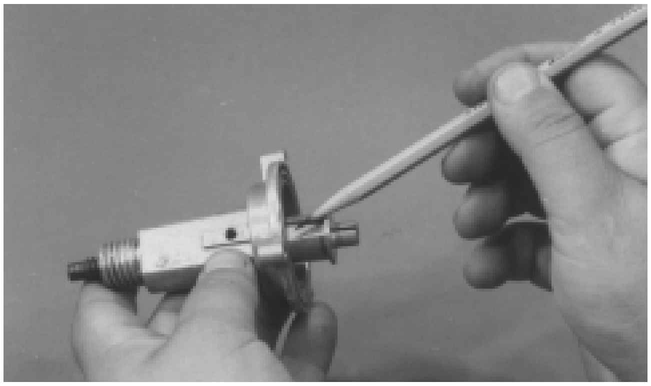
Fig. 8-149



AF424

3. With the flat surface of the adjuster socket located under the threaded hole in the housing, install an 8-32 set screw.

Fig. 8-150



AF403

Fig. 8-151

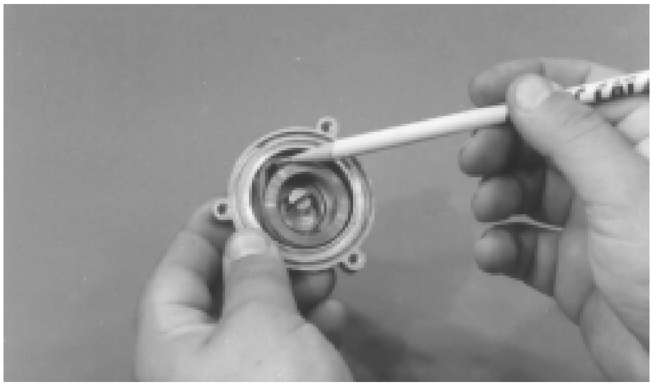


AF425

4. Install the bent tab of the spring into the slot of the adjuster socket with the outer hooked end of the spring positioned in the clockwise direction.

8

Fig. 8-152

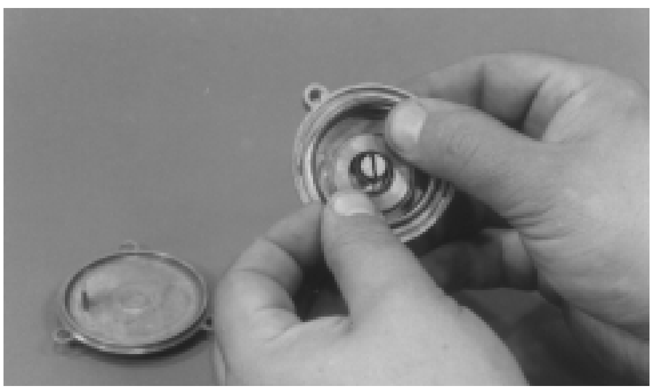


AF406

5. With the spring in position, remove the cable tie used to prevent it from unwrapping.

6. Place the O-ring seal into position; then set the end cap into position. Make sure its tab is hooked into the end of the spring.

Fig. 8-153



AF405

7. While holding the end cap down into position, rotate the end cap 20 turns clockwise to tension the spring.

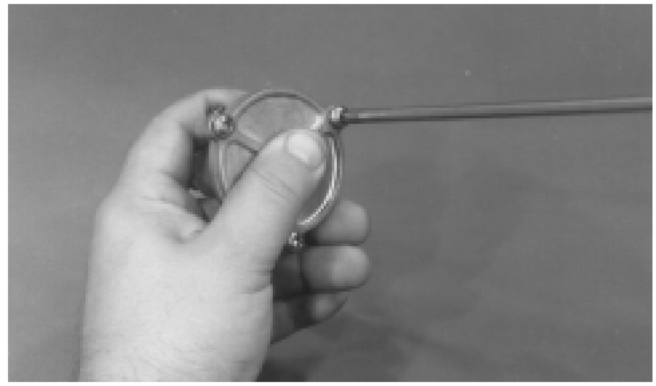
Fig. 8-154



AF400

8. Install the three cap screws (coated with blue Loctite #242) and tighten to 1 kg-m (7 ft-lb).

Fig. 8-155



AF419

9. Apply a thin coat of grease to the spring and place the spring into position in the end of the adjuster bolt.

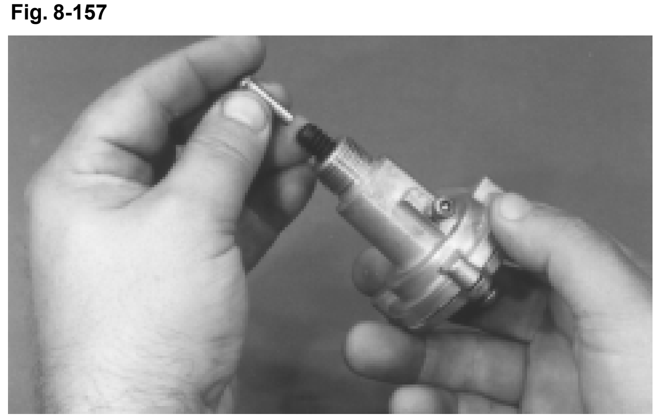
Fig. 8-156



AF401

10. Use a thin coat of grease on the stem shaft to hold it in position; then place the stem into the end of the adjuster bolt.

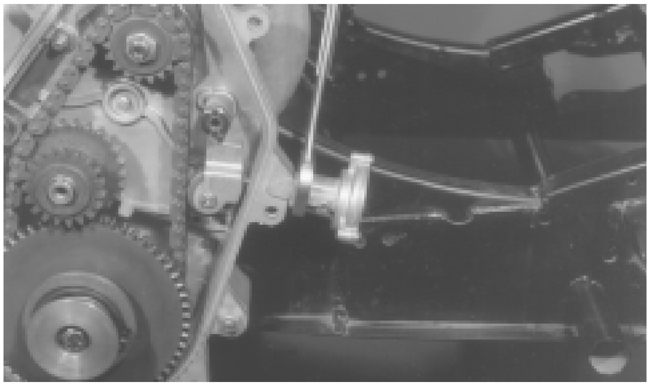
Fig. 8-157



AF418

11. Securely tighten the adjuster assembly to the chain case.

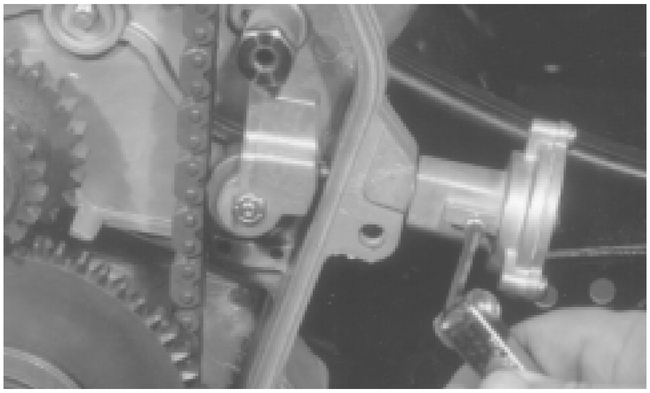
Fig. 8-158



AF417

12. Remove the set screw from the adjuster housing and install the cap screw.

Fig. 8-159



AF416

Brake System
(Hydraulic)

⚠ WARNING

Use only Arctic Cat approved Hi-Temp Brake Fluid (p/n 0638-315). Never substitute or mix different types or grades of brake fluid. Brake loss may occur. Brake loss can result in severe injury or even death.

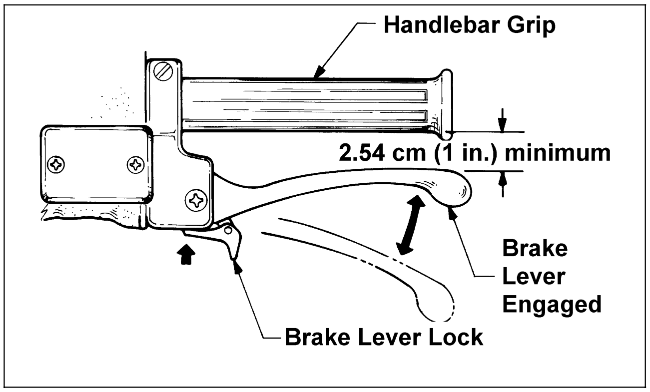
CHECKING BRAKE LEVER TRAVEL

1. Compress the brake lever fully.

■ **NOTE: Do not "pump" the brake lever as it will produce an inaccurate reading.**

2. Measure the distance between the brake lever and the handlebar. The distance must be greater than 2.54 cm (1 in.).

Fig. 8-160



0729-875

3. If the distance is less than specified, check the brake fluid level (see Checking and Adding Brake Fluid in this sub-section), inspect for leakage, and check the brake pads (see Checking and Replacing Brake Pads in this sub-section).

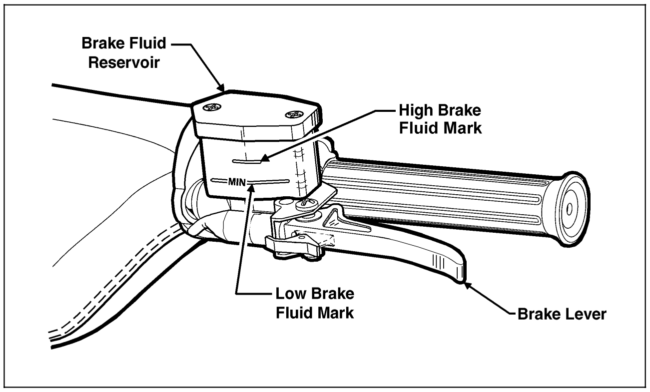
⚠ WARNING

Do not operate the snowmobile if the distance between the compressed brake lever and handlebar is less than 2.54 cm (1 in.). Brake loss may occur. Brake loss can result in severe personal injury.

CHECKING AND ADDING BRAKE FLUID

1. With the master cylinder in a level position, check fluid level in the reservoir. The brake fluid level must be just below the high mark.

Fig. 8-161



0734-397

2. If the brake fluid level is below the low mark, remove the reservoir cover and add approved brake fluid until the fluid level is just below the high mark. Install and secure the reservoir cover. DO NOT allow moisture to contaminate the brake system.

8

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

⚠ WARNING

Do not overfill the master cylinder reservoir. Overfilling the reservoir may cause the brake system to hydraulically lock. Use only approved brake fluid. Never substitute or mix different types or grades of brake fluid. Brake loss may occur. Brake loss can result in severe injury or even death.

CHANGING BRAKE FLUID

The brake fluid must be changed on a regular basis and/or whenever the brake fluid has been overheated or contaminated. The brake fluid should be changed every 1000 miles or at the end of the snowmobiling season, whichever occurs first.

Arctic Cat recommends the removal and disassembly of the brake caliper assembly when changing the brake fluid (see Removing/Installing Caliper in this sub-section).

⚠ CAUTION

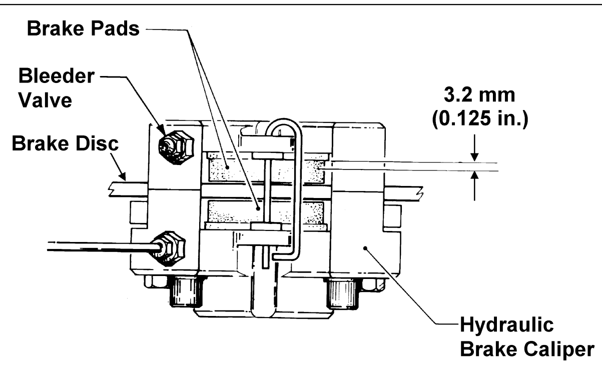
Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

⚠ WARNING

Use only Arctic Cat approved brake fluid. Any substitute may result in a loss of brakes.

1. Slide a piece of flexible tubing over the ball of the bleeder valve and direct the other end into a container.

Fig. 8-162



0730-434

2. Slowly compress the brake lever and hold. Open the bleeder valve to release the fluid; then compress the brake lever repeatedly until all brake fluid is expelled. Close the bleeder valve.

3. Add new approved brake fluid to the reservoir; then compress the brake lever and hold. Open the bleeder valve. Repeat the compression until brake fluid flows free of air bubbles and appears clean.

■ **NOTE: It may be necessary to refill the reservoir a number of times to eliminate all air bubbles in the system.**

4. When the brake fluid is free of all air and the brake lever feels firm when compressed, fill the reservoir to a level just below the high mark; then install and secure the cover. Remove the tube from the bleeder valve.

5. Proceed to bleed the brake system (see Bleeding Brake System in this sub-section).

BLEEDING BRAKE SYSTEM

If the brake lever feels "spongy" when applied, the brake system may need to be bled. To bleed the brake system, use the following procedure.

1. Remove the master cylinder reservoir cover and fill the reservoir to the high mark with approved brake fluid.

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

⚠ WARNING

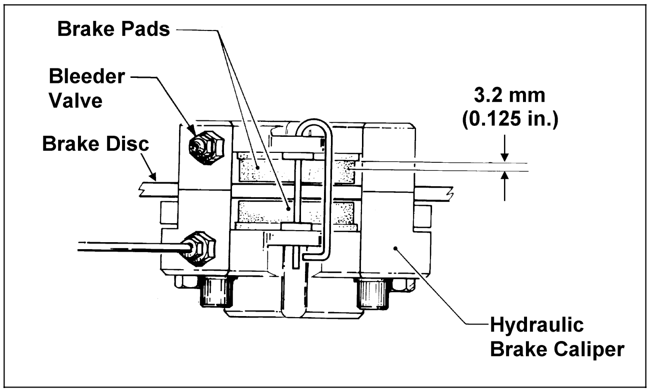
Use only approved brake fluid. Any substitute may result in a loss of brakes.

⚠ WARNING

Do not use brake fluid from a container that has been opened for a long period of time. Unsealed brake fluid containers will absorb moisture and can contaminate the fluid inside.

2. Slide a piece of flexible tubing over the ball of the bleeder valve and direct the other end into a container.

Fig. 8-163



0730-434

3. Slowly compress the brake lever and hold. Open the bleeder valve to release the fluid and air. When the fluid stops flowing, close the bleeder valve; then release the brake lever.

4. Repeat step 3 until the brake fluid flows free of air bubbles.

■ **NOTE: It may be necessary to refill the reservoir during the bleeding process.**

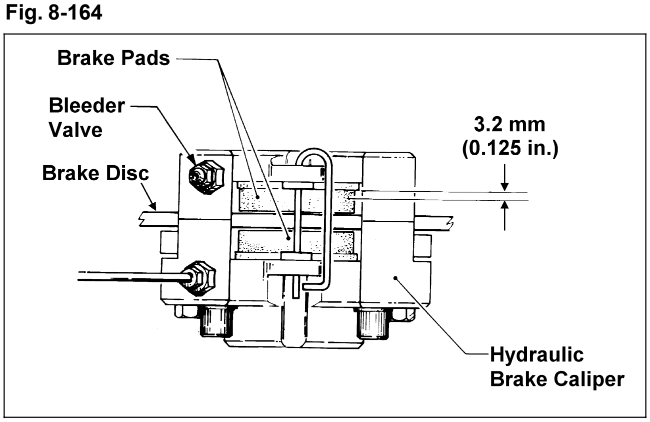
5. When the brake fluid is free of all air and the brake lever feels firm when compressed, fill the reservoir to a level just below the high mark; then install and secure the cover. Remove the tube from the bleeder valve.

CHECKING AND REPLACING BRAKE PADS

To check and replace the brake pads, use the following procedure.

1. Measure the thickness of both brake pads. The brake pad thickness must be greater than 3.2 mm (0.125 in.). If the brake pad thickness is less than specified, replacement of both pads is necessary.

Fig. 8-164

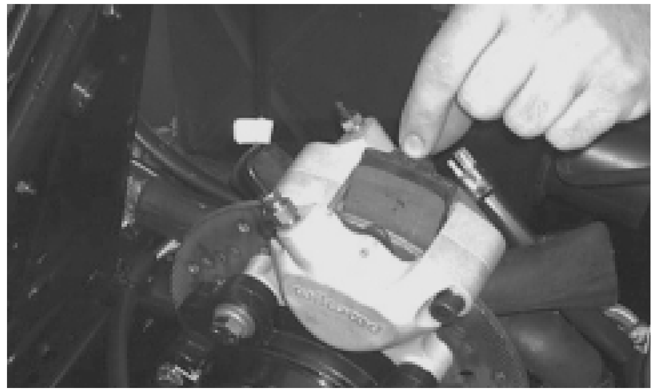


0730-434

2. Remove the retaining pin securing the brake pads to the caliper assembly.

3. Pull both brake pads out of the caliper assembly.

Fig. 8-165



AF255D

4. Using a large screwdriver, slowly push both brake pistons into the caliper.

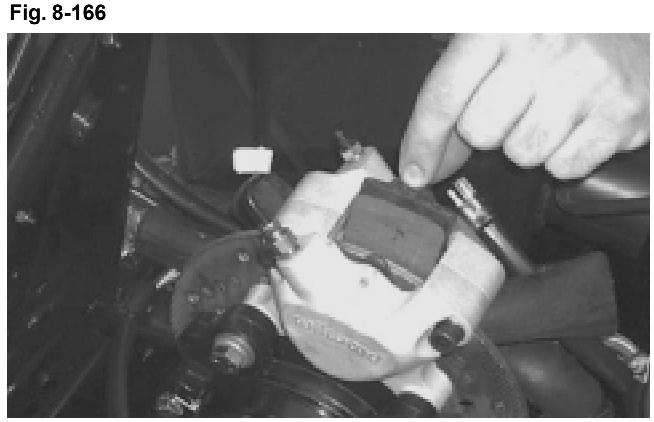
⚠ CAUTION

Care must be taken not to pry against the brake disc when pushing on the pistons or severe damage may occur.

5. Position the new brake pads into the caliper and secure with the retaining pin.

■ **NOTE: When installing new brake pads, always install them as a set. Never install just one pad or use brake pads which have been used in another machine.**

Fig. 8-166



AF255D

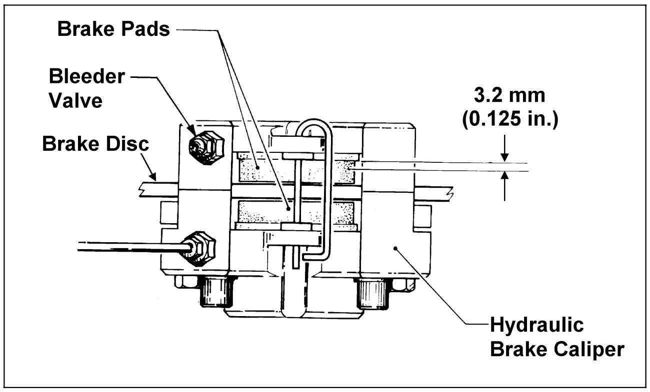
6. Compress the brake lever repeatedly to ensure correct positioning of the brake pads; then release.

■ **NOTE: When new brake pads are installed, a "burnishing" process is required. Drive the snowmobile slowly and compress the brake lever repeatedly until the pads just start to heat up; then allow them to cool down. This process stabilizes the pad material and extends the life of the pads.**

REMOVING CALIPER

1. Slide a piece of flexible tubing over the ball of the bleeder valve and direct the other end into a container.

Fig. 8-167

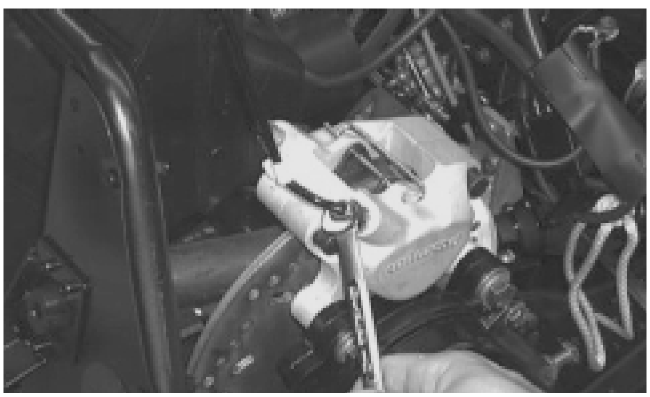


0730-434

2. Open the bleeder valve and compress the brake lever several times to drain the reservoir of fluid.

3. Remove the brake hose from the caliper. Use an absorbent towel to collect any remaining brake fluid.

Fig. 8-168

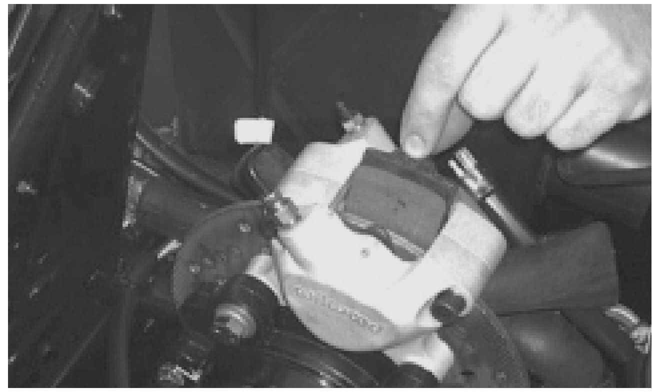


AF262D

> ⚠ **CAUTION**
>
> **Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.**

4. Remove the retaining pin securing the brake pads to the caliper assembly; then remove the brake pads.

Fig. 8-169



AF255D

5. Loosen the upper socket-head cap screws securing the caliper halves; then remove the two cap screws and lock washers securing the brake caliper to the chain case. Account for two spacer washers.

Fig. 8-170



AF261D

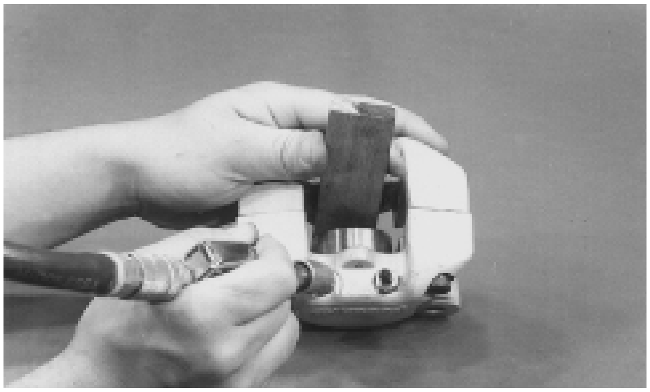
6. Remove the caliper assembly from the engine compartment.

DISASSEMBLING

1. Position a piece of wood between the pistons. Using low-pressure compressed air, blow into the caliper brake hose fitting to remove the brake pistons.

> ⚠ **WARNING**
>
> **Always wear safety glasses when using compressed air.**

Fig. 8-171



AF248

2. Remove the two cap screws securing the caliper halves. Account for the small O-ring.

3. Remove the piston O-rings and discard.

Fig. 8-172



AF264

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the brake pistons for gouges, cracks, pitting, scuffing, or corrosion. If any of these conditions exist, replace the piston.

2. Clean the piston outer surface by using a Scotch-Brite pad and clean brake fluid as a cleaner.

> ⚠ **CAUTION**
>
> **Do not use any sharp cleaning tool on the piston surface as it may cause damage. Parts-cleaning solvent must not be used as it can damage the piston O-ring.**

Fig. 8-173



AF230

3. Inspect the brake caliper for gouges, cracks, pitting, scuffing, or corrosion. If any of these conditions exist, replace the caliper.

4. Clean the caliper inner wall surface using a soft Scotch-Brite pad and clean brake fluid. Wipe caliper wall clean with a clean rag and brake fluid.

Fig. 8-174



AF267

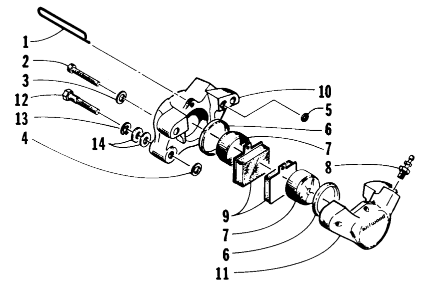
5. Inspect the condition of the brake pads. Replace if damaged or worn. The brake pad thickness must be greater than 3.2 mm (0.125 in.). If the brake pad thickness is less than specified, replacement of both pads is necessary.

6. Inspect the brake hose for cracks and deterioration and check the condition of the threaded connectors.

ASSEMBLING

Fig. 8-175

KEY
1. Retaining Pin
2. Cap Screw
3. Washer
4. Washer
5. Housing O-Ring
6. O-Ring
7. Piston
8. Bleeder Fitting
9. Brake Pad Set
10. Housing
11. Housing
12. Cap Screw
13. Lock Washer
14. Washer



730-369A

1. Apply approved brake fluid to the new O-ring; then install the O-ring into the groove of each caliper half.

Fig. 8-176



AF251

■ **NOTE: Always use a new O-ring when assembling the brake caliper.**

2. In each caliper half, apply approved brake fluid to the brake piston; then while twisting, install the piston with the open side facing out.

Fig. 8-177



AF266

Fig. 8-178



AF269

3. Place the small O-ring into position; then assemble the two caliper halves. Secure with the two socket-head cap screws. Do not tighten at this time.

Fig. 8-179



AF264

INSTALLING CALIPER

1. Secure the caliper assembly on the chain case using two cap screws, lock washers, and spacer washers. Tighten the cap screws to 4.2 kg-m (30 ft-lb). Tighten the upper socket-head cap screws to 5 kg-m (36 ft-lb).

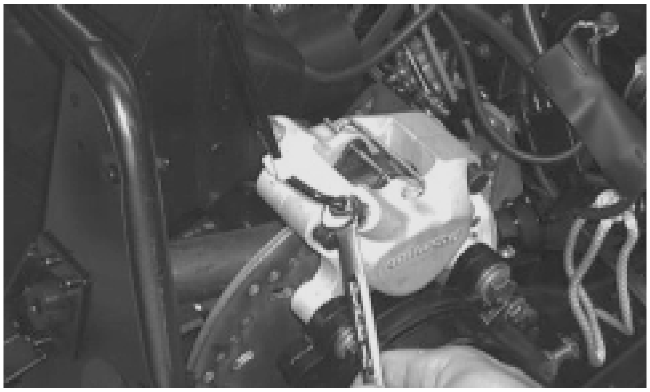
Fig. 8-180



AF261D

2. Install the brake hose on the caliper and tighten securely.

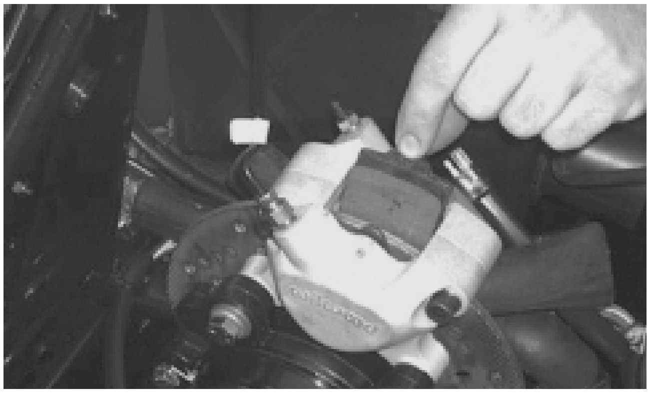
Fig. 8-181



AF262D

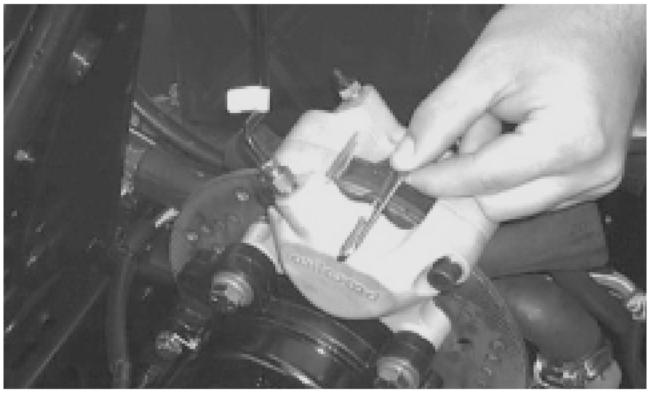
3. Install the brake pads. Secure with the retaining pin.

Fig. 8-182



AF255D

Fig. 8-183



AF237D

4. Bleed the brake system (see Bleeding Brake System in this sub-section).

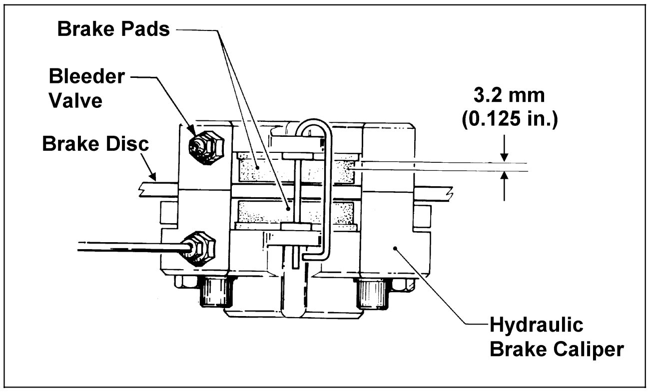
■ **NOTE: If new brake pads were installed, a "burnishing" process is required. Drive the snowmobile slowly and compress the brake lever repeatedly until the pads just start to heat up; then allow them to cool down. This process stabilizes the pad material and extends the life of the pads.**

Brake Lever/Master Cylinder Assembly
(Hydraulic System)

REMOVING

1. Slide a piece of flexible tubing over the ball of the bleeder valve and direct the other end into a container. Remove the reservoir cover; then open the bleeder valve. Allow the brake fluid to drain completely.

Fig. 8-184



0730-434

2. Using a small screwdriver, push in on the self-locking tab; then slide the brakelight switch free of the brake control.

Fig. 8-185



AF201D

3. Place an absorbent towel around the connection to absorb brake fluid. Remove the brake fluid hose from the master cylinder.

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the snowmobile.

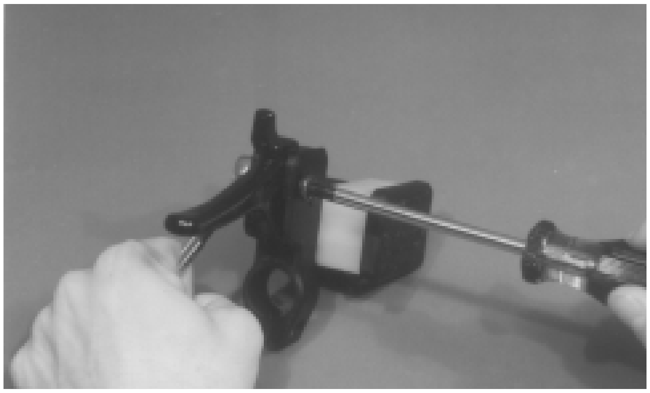
8

4. Remove the two torx-head screws and clamp securing the brake assembly to the handlebar; then remove the assembly from the handlebar.

DISASSEMBLING

1. Remove the screw and lock nut securing the brake lever.

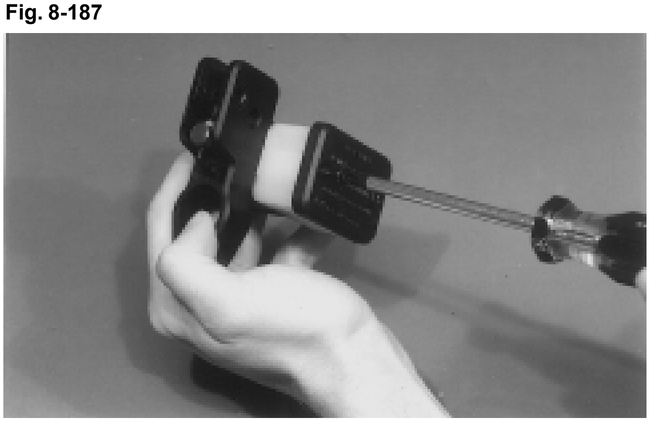
Fig. 8-186



AF202

2. Remove the two screws securing the reservoir cover; then remove the cover.

Fig. 8-187

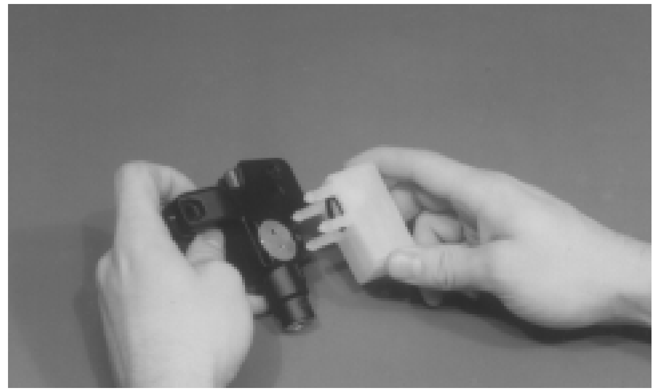


AF204

3. Remove the two screws securing the reservoir to the master cylinder.

4. Compress the locking tabs of the reservoir and remove the reservoir from the master cylinder. Account for an O-ring seal.

Fig. 8-188



AF205

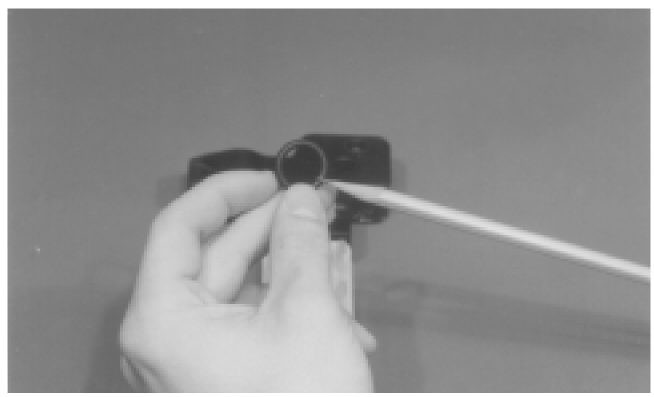
INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the screw securing the brake lever for wear and for cracked, stretched, or damaged threads.

2. Inspect the O-ring for deterioration and distortion.

Fig. 8-189



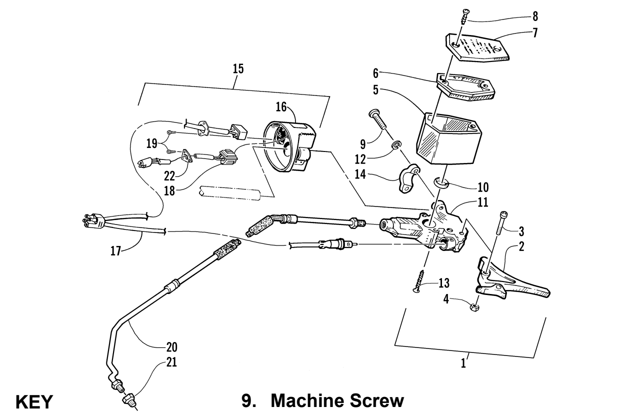
AF206

3. Inspect the reservoir for cracks and leakage.

4. Inspect the brake fluid hose for cracks, deterioration, and the condition of the fittings (threaded and compression).

ASSEMBLING

Fig. 8-190



KEY
1. Brake Assy
2. Brake Lever
3. Lever Mounting Screw
4. Lock Nut
5. Reservoir
6. Gasket
7. Cover
8. Screw
9. Machine Screw
10. O-Ring
11. Master Cylinder
12. Lock Washer
13. Screw
14. Clamp
15. Dimmer Control Assy
16. Dimmer Control Housing
17. Switch and Harness
18. Switch Harness
19. Screw
20. Hose
21. Adapter Fitting
22. Plate

0733-786

Fig. 8-191

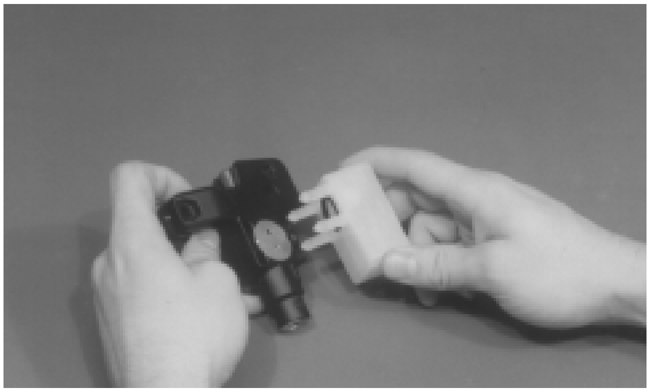


AF207

1. Apply approved high temperature brake fluid to the O-ring seal; then install the seal on the reservoir.

2. Install the reservoir on the master cylinder. Secure with two screws.

Fig. 8-192



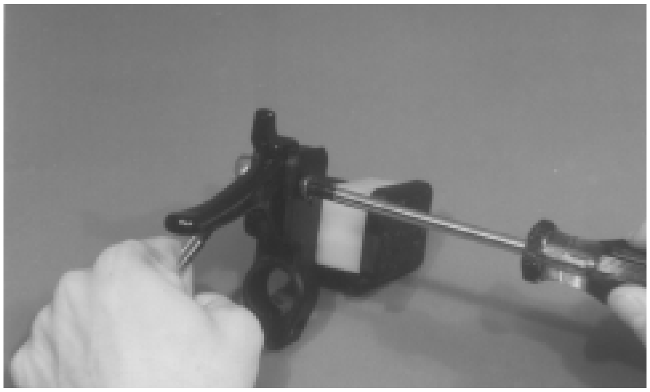
AF205

3. Install the brake lever. Secure with a screw and a new lock nut. Tighten the lock nut just to the point of ensuring free brake lever movement.

⚠ WARNING

Do not over-tighten the lock nut. Over-tightening the lock nut will cause the brake lever to bind. The lever must work freely and fully return to its stop after installation.

Fig. 8-193



AF202

⚠ WARNING

A new lock nut must be used to secure the brake lever.

INSTALLING

1. Position the brake assembly on the handlebar. Secure with two torx-head machine screws and clamp; tighten securely.

2. Install the hose on the master cylinder. Tighten securely.

Fig. 8-194



AF911D

3. Slide the brakelight switch into the brake control until the self-locking tab snaps into position. Lightly pull on the switch to make sure it is properly secured.

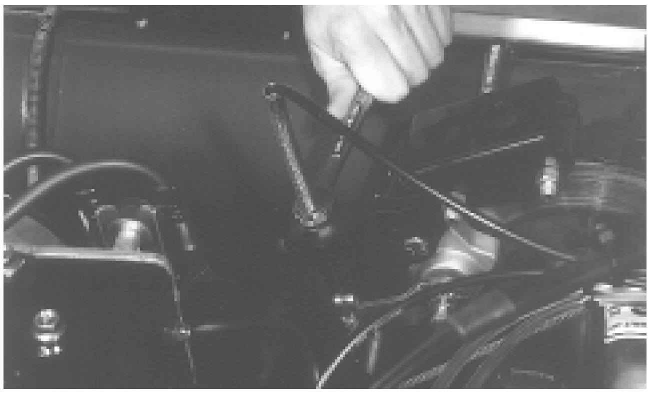
4. Bleed the brake system.

Brake System
(Mechanical)

REMOVING

1. Loosen the upper flange nut securing the brake cable to the brake cable bracket; then slide the cable free of the bracket.

Fig. 8-195

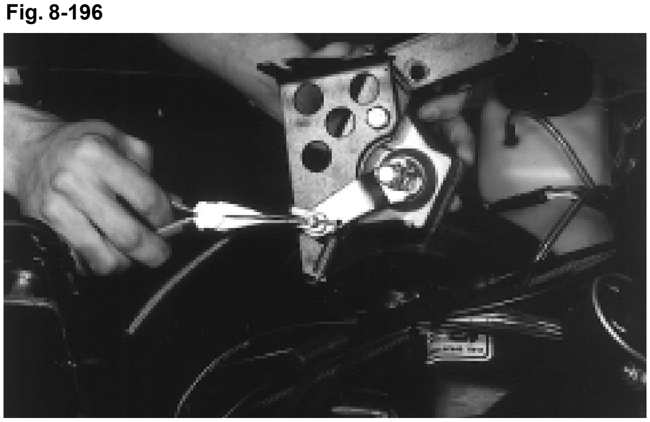


AF145

2. Remove the two cap screws securing the brake bracket to the chain case; then remove the brake caliper assembly. Account for four spacers.

3. Remove the cotter pin and clevis pin securing the clevis to the actuator lever; then remove the spring.

Fig. 8-196

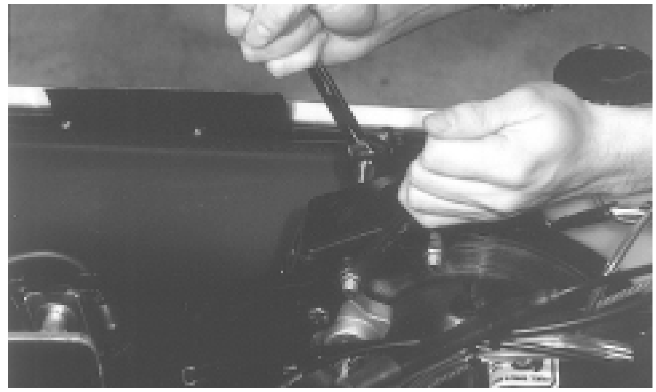


AF148

DISASSEMBLING

1. Remove the two cap screws and lock nuts securing the brake caliper assembly to the brake bracket; then remove the brake caliper assembly.

Fig. 8-197



AF146

2. Remove the cable bracket, caliper assembly, and carrier caliper with stationary brake pad.

3. Remove the movable pad and plate from the caliper assembly.

Fig. 8-198



B485

4. Remove the spiral with actuator lever from the caliper assembly.

Fig. 8-199

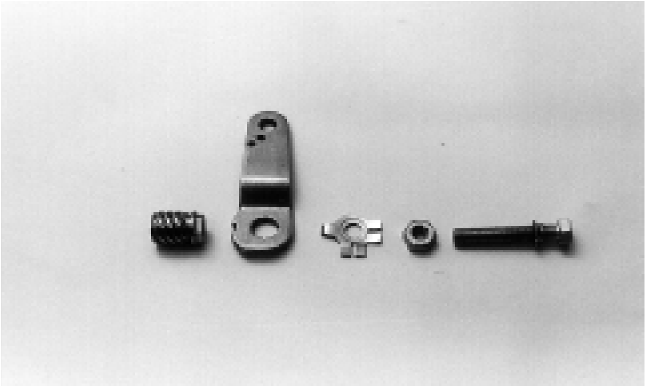


B486

5. Bend the locking tab away from the adjusting bolt jam nut.

6. Remove the adjusting bolt with jam nut from the spiral. Remove the jam nut and locking tab.

Fig. 8-200

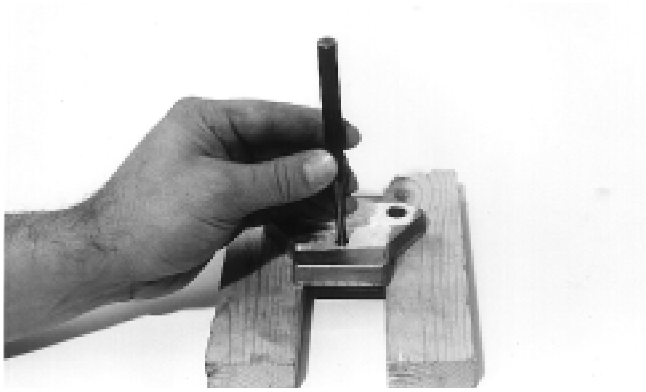


B487

7. Using a punch, remove the stationary brake pad from the carrier caliper. The carrier caliper has an access hole to aid in pad removal.

■ **NOTE: Do not remove the stationary brake pad unless replacement is necessary.**

Fig. 8-201



B488

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Wash all brake components with parts-cleaning solvent and dry thoroughly.

2. Inspect all brake components for signs of wear, fatigue, cracks, or stripped threads.

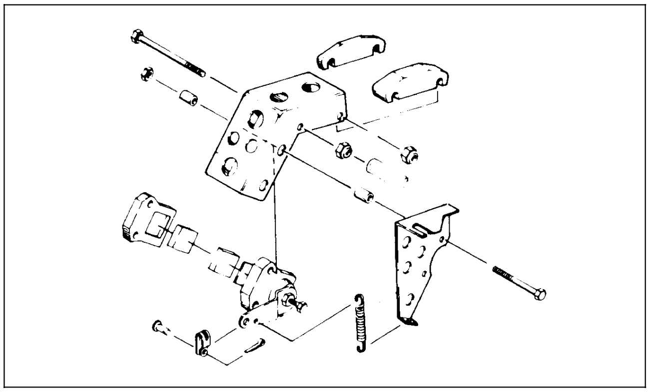
3. Inspect the spring for cracks, stretching, or unusual bends.

4. Inspect the brake pads for wear. Pads must be at least 6.2 mm (0.245 in.) thick.

■ **NOTE: When replacing brake pads, replace both pads as a set.**

ASSEMBLING

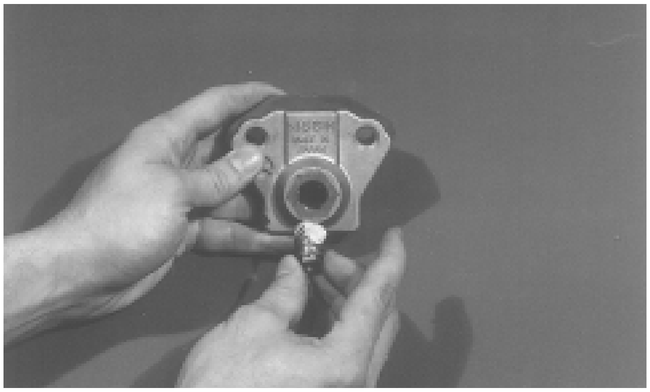
Fig. 8-202



728-328B

1. Apply a low-temperature grease to the actuator shaft; then install the shaft into the actuator.

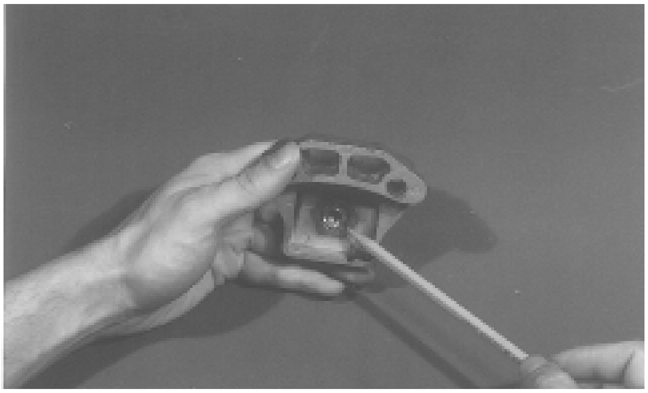
Fig. 8-203



AF149

2. Turn the actuator shaft clockwise until it is flush with the inside of the brake actuator.

Fig. 8-204

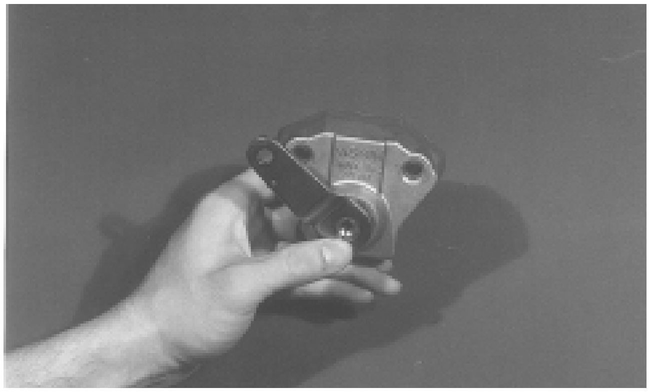


AF150

3. Install the actuator lever on the actuator shaft in the 10 o'clock position.

8

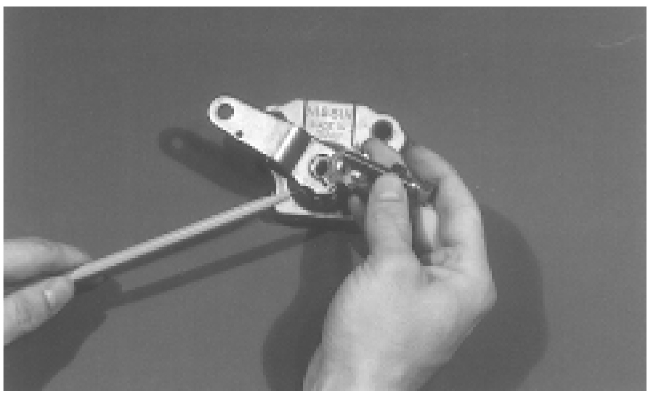
Fig. 8-205



AF151

4. Install the adjusting bolt, jam nut, and locking tab.

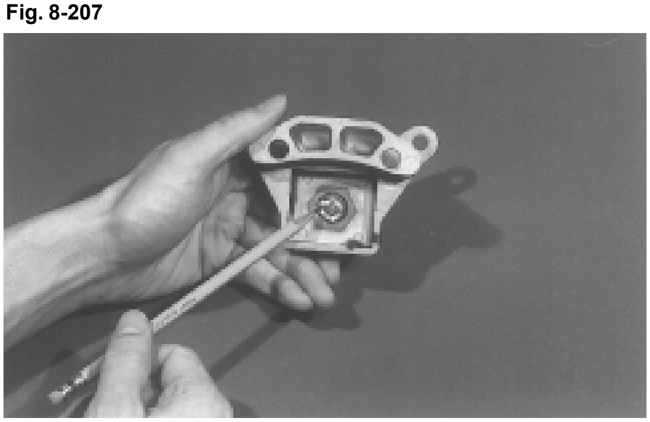
Fig. 8-206



AF152

■ **NOTE: The end of the adjusting bolt must be flush with the actuator shaft.**

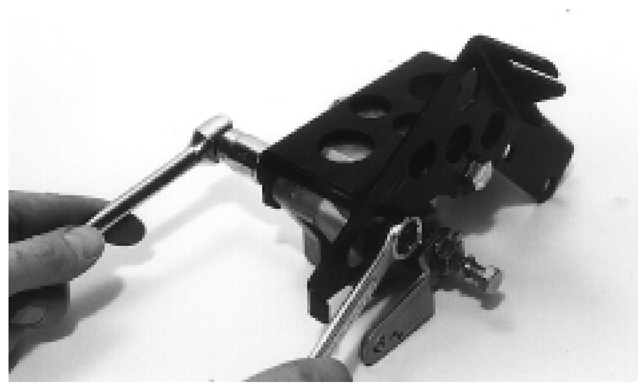
Fig. 8-207



AF153

5. Secure the caliper assembly and four spacers to the caliper bracket and cable bracket with two cap screws and nuts. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 8-208



B483

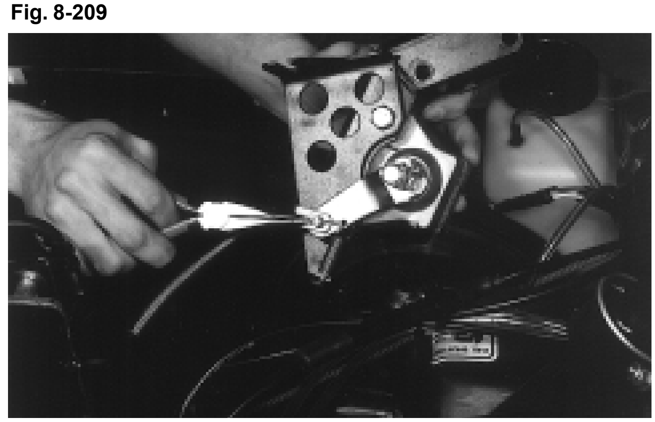
6. Install the plate and brake pad into the actuator side of the caliper; then apply an adhesive to one side of the stationary pad and install (adhesive side first) into the stationary side of the caliper assembly.

INSTALLING

1. Place the clevis onto the end of the brake cable; then place the clevis into position on the actuator lever and secure with the clevis pin and cotter pin. Attach the spring.

⚠ CAUTION
Make sure the clevis has free movement.

Fig. 8-209



AF148

2. Place the brake assembly into position on the chain case; then secure with two cap screws and lock nuts. Tighten to 4.2 kg-m (30 ft-lb).

Fig. 8-210

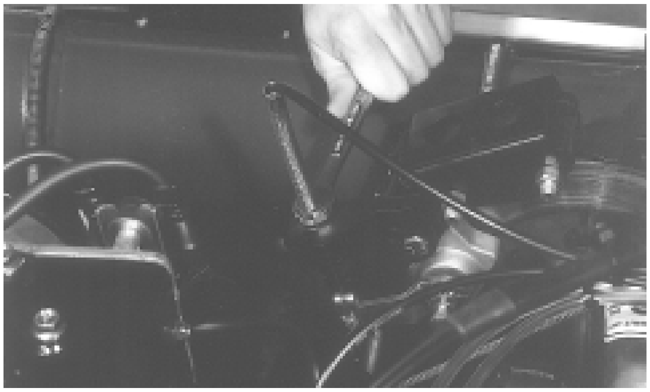


AF146

3. Place the brake cable onto the brake cable bracket and secure with the upper flange nut.

■ **NOTE: The flange nuts should be centered on the brake cable end.**

Fig. 8-211



AF145

ADJUSTING BRAKE LEVER TRAVEL

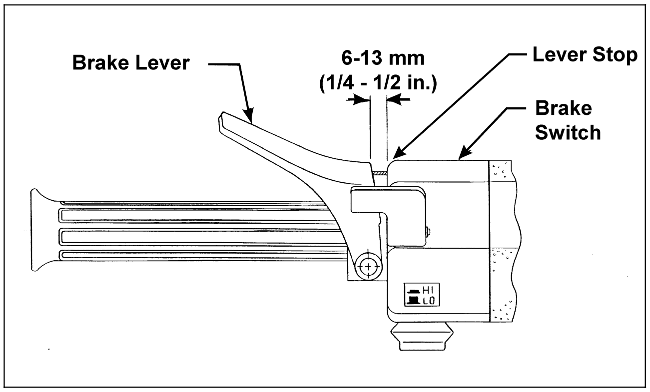
⚠ WARNING

Make all brake lever travel adjustments with the adjusting bolt only!

1. Rotate the brake disc alternately forward and backward while slowly compressing the brake lever.

2. At the point where the disc is locked, check the distance between the brake lever and the lever stop. The distance must be within a range of 6-13 mm (1/4-1/2 in.).

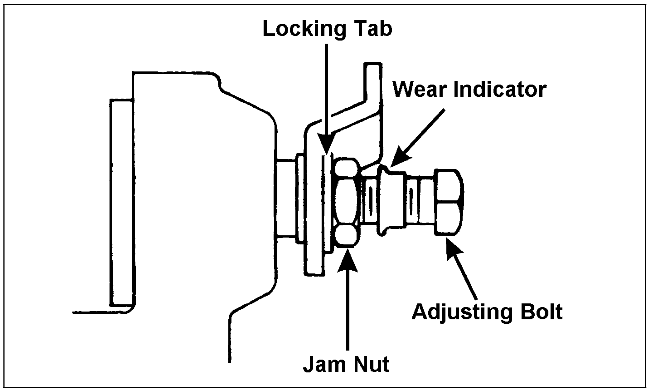
Fig. 8-212



0727-451

3. To decrease brake lever travel (set up the brake), bend the locking tab back and loosen the adjusting bolt jam nut. Tighten the adjusting bolt and check brake lever travel distance periodically until correct travel distance is attained.

Fig. 8-213



0726-753

Fig. 8-214



B494

⚠ CAUTION

Do not attempt to adjust the brake with the flange nuts on the brake cable bracket. Incorrect brake adjustment may occur causing possible brake failure.

4. To increase brake lever travel (loosen the brake), bend the locking tab back and loosen the adjusting bolt jam nut. Loosen the adjusting bolt and check brake lever travel distance periodically until correct travel distance is attained.

5. Tighten the jam nut and secure with the locking tab after adjustment is completed.

⚠ WARNING

When the brake pads are new, there will be 6 mm (0.240 in.) clearance between the wear indicator and the adjusting bolt jam nut. When the wear indicator bottoms on the jam nut with the jam nut tight against the actuator lever, both brake pads MUST BE REPLACED.

Brake System (Mechanical/Quick-Adjust)

08

REMOVING

1. Remove the cotter pin, washer, pin, and clevis from the brake actuator arm.

Fig. 8-215



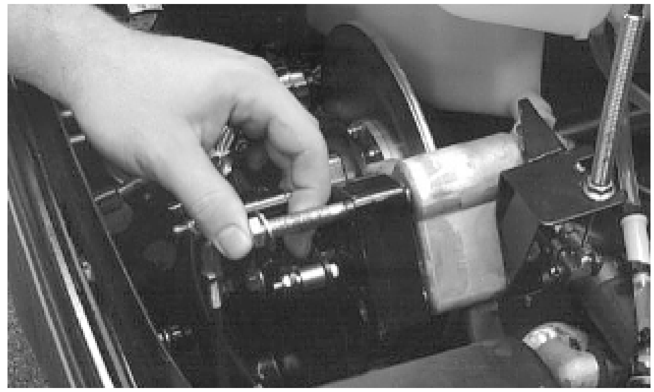
AF297D

2. Remove the recoil starter rope from the brake cable bracket.

3. Loosen the jam nut on the brake cable and remove the cable from the bracket.

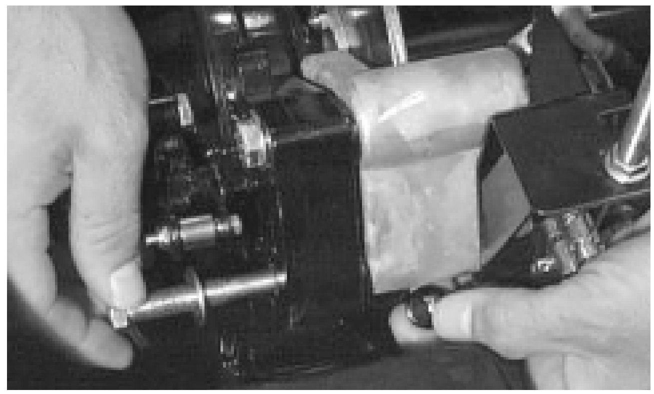
4. Loosen and remove the two mounting cap screws (account for the front alignment ball) and remove the brake caliper.

Fig. 8-216



AF460D

Fig. 8-217

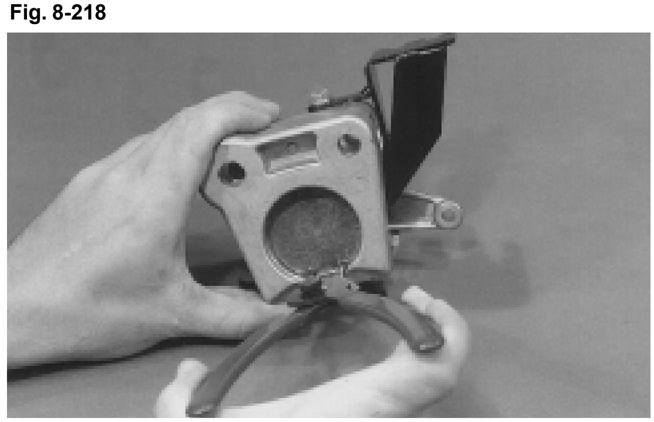


AF293D

DISASSEMBLING

1. Remove the snap ring on the stationary side of the caliper.

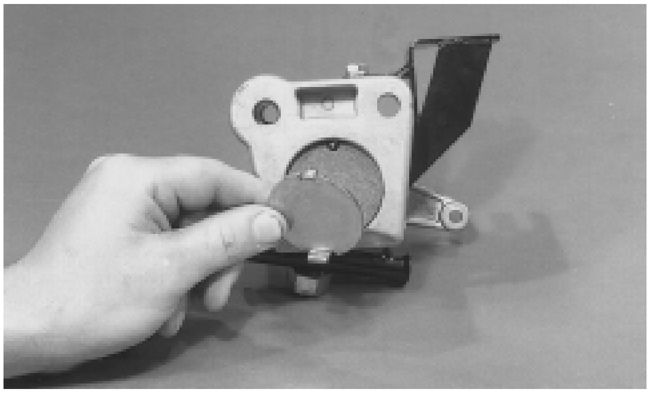
Fig. 8-218



AF318A

2. Remove the brake pad support plate.

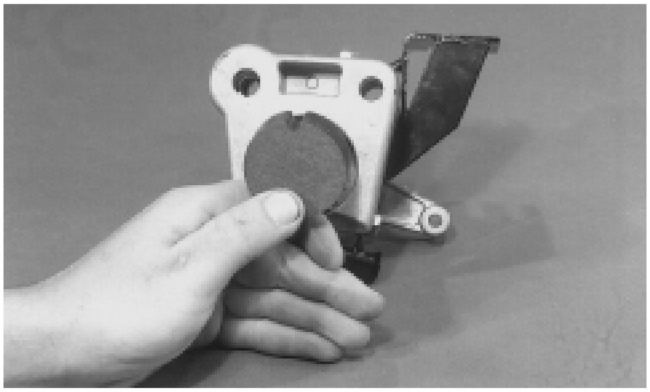
Fig. 8-219



AF356

3. Remove the stationary brake pad.

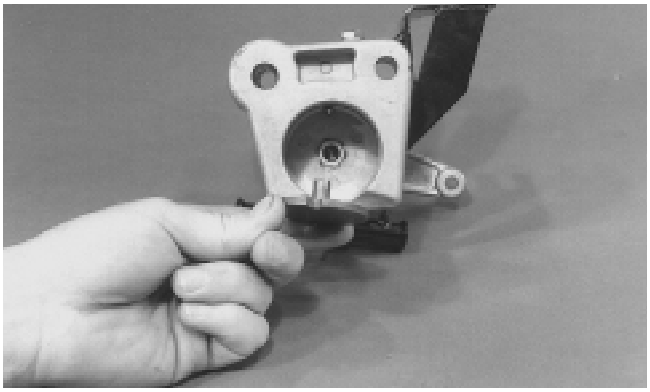
Fig. 8-220



AF354

4. Remove the movable brake pad.
5. Remove the brake piston.

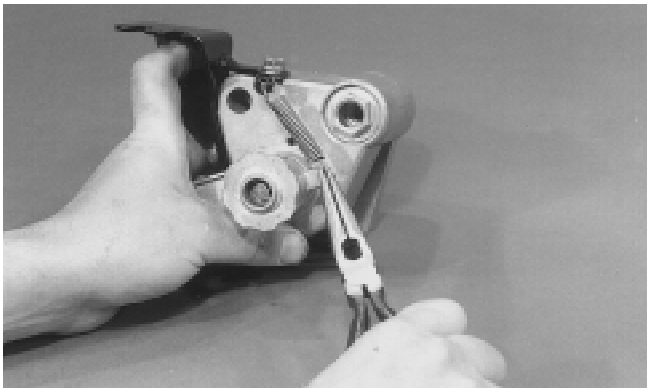
Fig. 8-221



AF353

6. Remove the brake actuator arm return spring.

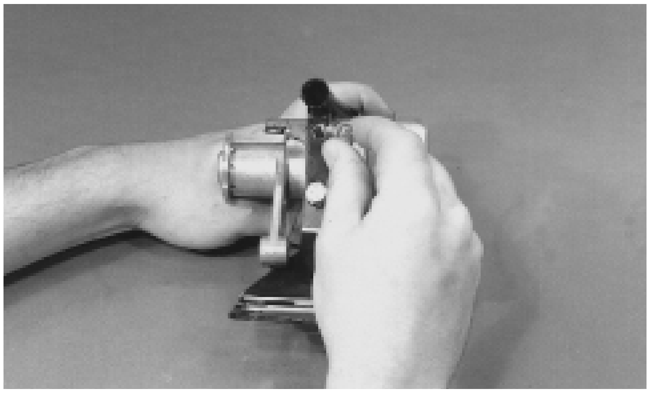
Fig. 8-222



AF351A

7. Loosen and remove the three cap screws securing the brake cable bracket and remove the bracket.

Fig. 8-223



AF326

8. Remove the brake actuator arm assembly from the caliper.

Fig. 8-224

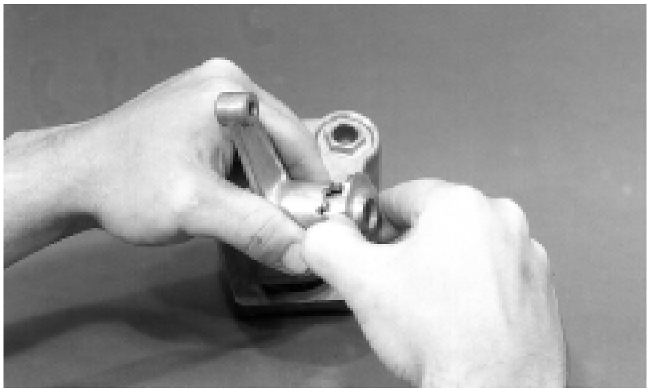


AF283

9. Pull out on the quick-adjust knob and turn counterclockwise to remove.

8

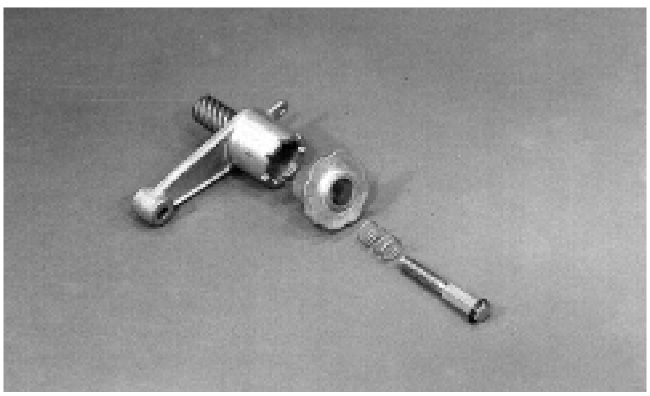
Fig. 8-225



AF328

10. Remove the adjustment bolt and spring from the quick-adjust knob.

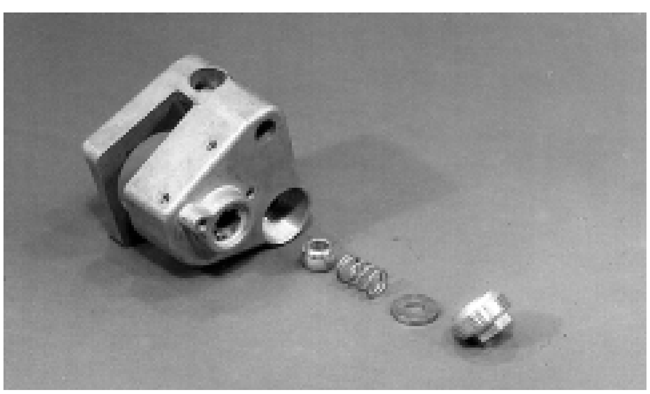
Fig. 8-226



AF333

11. On the rear of the caliper, loosen and remove the jam nut, washer, spring, and ball assembly.

Fig. 8-227



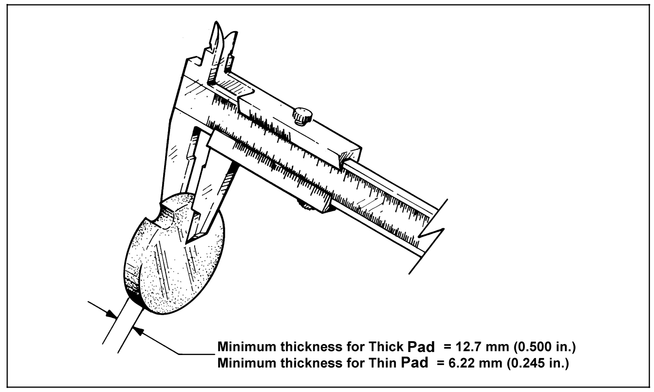
AF331

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Using a calipers, measure the stationary and movable brake pads. The movable brake pad thickness must exceed 12.7 mm (0.500 in.). The stationary brake pad thickness must exceed 6.22 mm (0.245 in.).

Fig. 8-228



0730-504

■NOTE: When replacing brake pads, always replace both pads as a set.

2. Wash all brake components with parts-cleaning solvent and dry thoroughly.

3. Inspect all brake components for signs of wear, fatigue, cracks, or stripped threads.

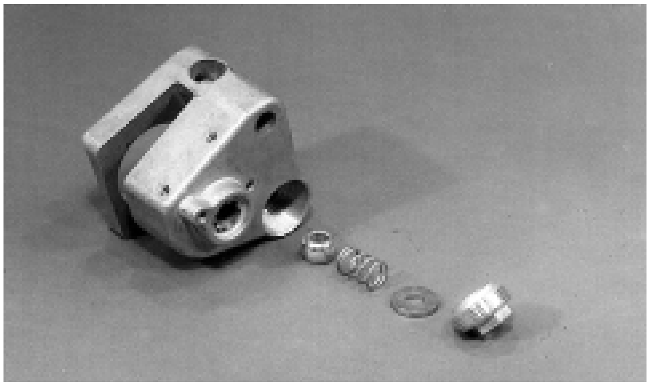
4. Inspect the spring for cracks, stretching, or unusual bends.

5. Inspect the brake cable for any signs of fraying or broken strands. Replace as needed.

ASSEMBLING

1. In the rear mounting hole of the caliper, temporarily install the mounting cap screw. In sequence, install the alignment ball (apply a small amount of grease to the ball), spring, washer, and jam nut. Turn the jam nut in until slight spring pressure is felt; then remove the mounting cap screw.

Fig. 8-229



AF331

2. Apply Arctic Cat Hi-Temp Wheel Bearing Grease (p/n 0436-094) to the actuator shaft.

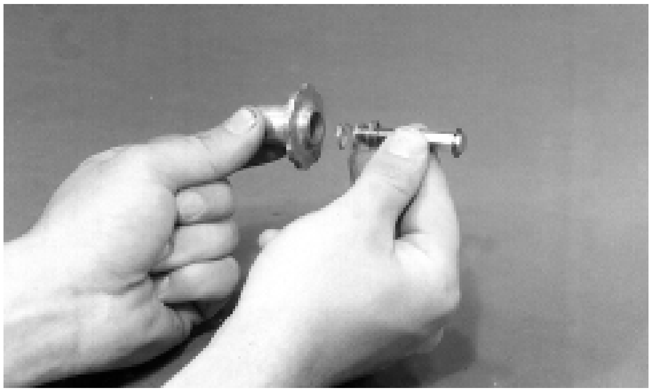
Fig. 8-230



AF327

3. Insert the adjustment bolt with spring and quick-adjust knob into the actuator assembly and turn in 2 or 3 turns.

Fig. 8-231



AF329

4. With the actuator shaft arm in the 11 o'clock position (located over the front mounting hole), install the actuator shaft into the brake caliper assembly.

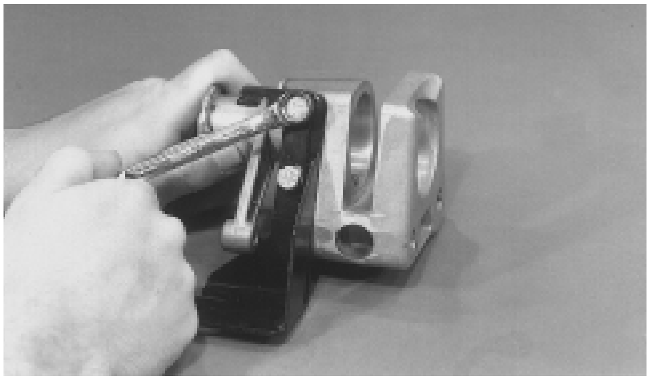
Fig. 8-232



AF338

5. Place the brake cable bracket and rope guide into position and secure with the three cap screws and lock washers.

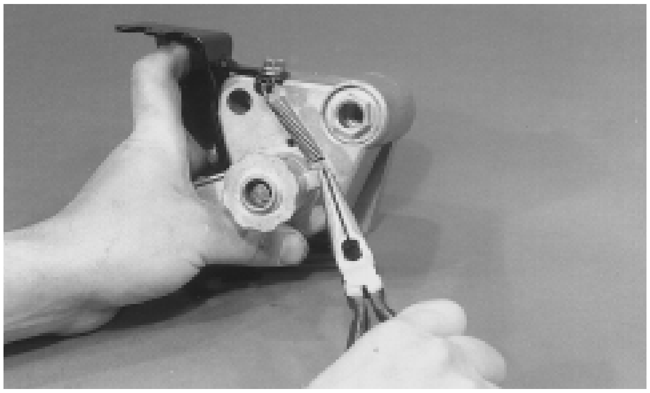
Fig. 8-233



AF352A

6. Install the brake arm actuator return spring.

Fig. 8-234

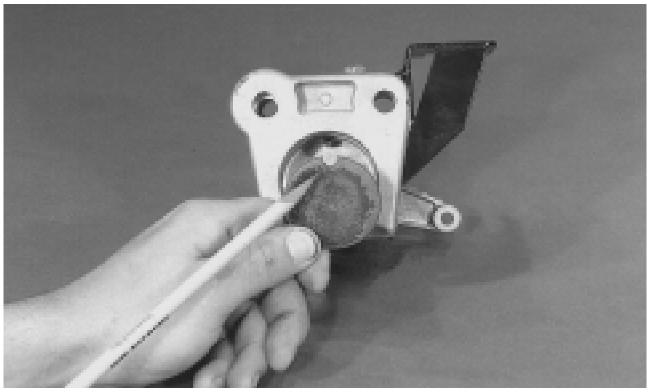


AF351A

7. Install the brake piston making sure that the slot in the piston aligns with the roll pin in the caliper.

8

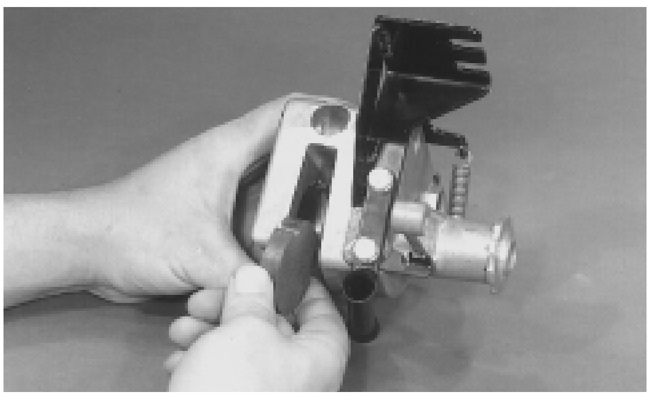
Fig. 8-235



AF325A

8. Install the movable (thick) brake pad into the caliper making sure that the slot in the pad aligns with the roll pin in the caliper.

Fig. 8-236



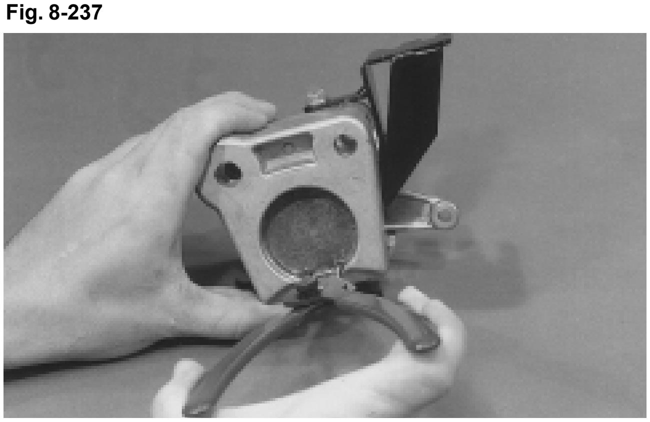
AF320

9. Install the snap ring into the caliper making sure that the sharp edge of the snap ring faces out and the opening faces down.

⚠ WARNING

Be sure the snap ring is fully seated. Personal injury may result if the snap ring isn't seated properly within the slot of the caliper.

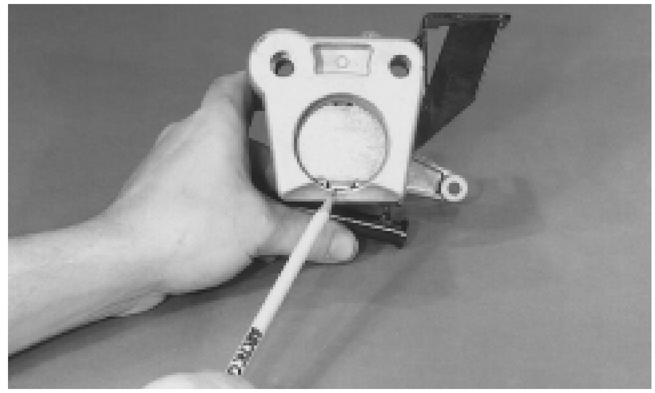
Fig. 8-237



AF318A

10. Install the brake pad support plate with the large tab located in the opening of the snap ring.

Fig. 8-238



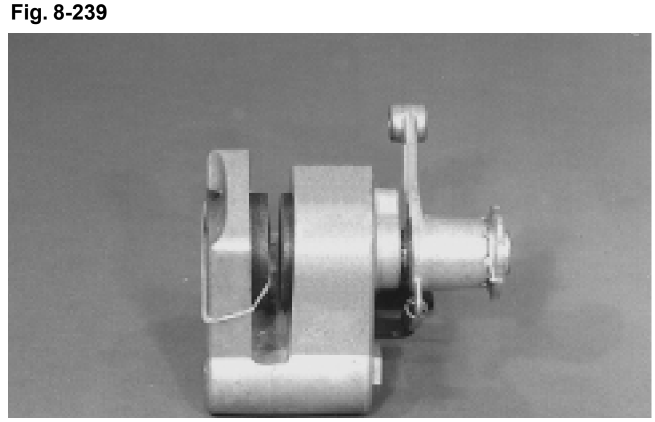
AF322

11. Install the stationary (thin) brake pad into the caliper making sure the slot in the pad aligns with the small tab on the support plate. Use a rubber band to hold the pad and plate in position.

INSTALLING

1. With the rubber band holding the stationary pad and support plate in position, install the caliper assembly over the brake disc. Remove the rubber band.

Fig. 8-239



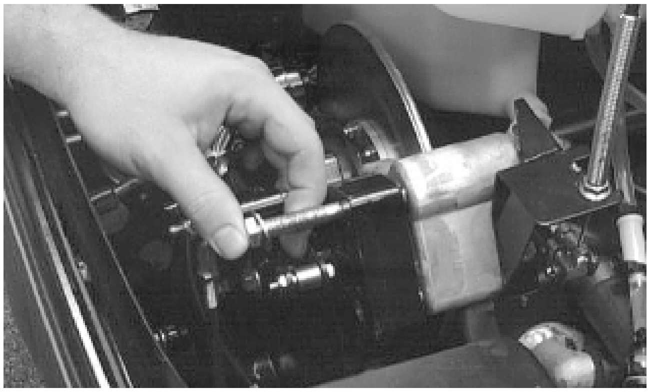
AF321A

⚠ CAUTION

Make sure that the brake pads are properly positioned in the caliper or damage to the brake system will result.

2. Apply green Loctite #609 to the rear mounting cap screw with washer and install. DO NOT TIGHTEN AT THIS TIME.

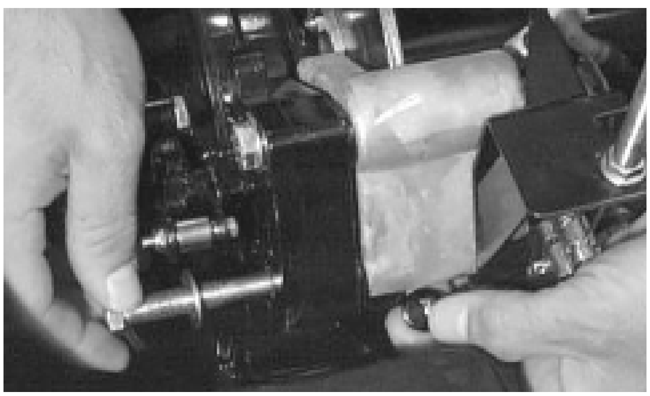
Fig. 8-240



AF460D

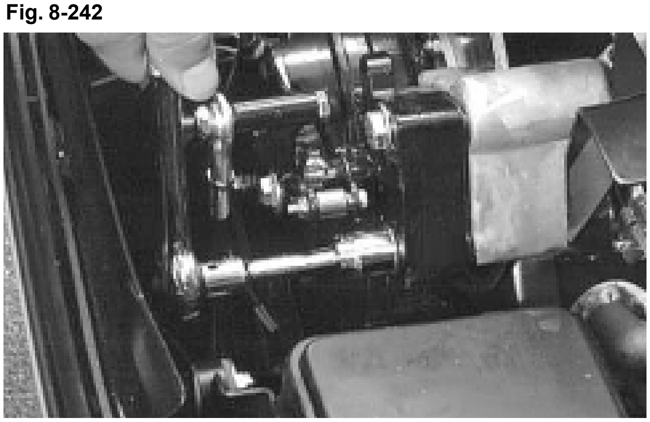
3. Apply a small amount of grease to the alignment ball and install into the front of the caliper. Apply green Loctite #609 to the front cap screw with washer; then install and tighten both cap screws to 4.2 kg-m (30 ft-lb).

Fig. 8-241



AF293D

Fig. 8-242



AF458D

4. Place the brake cable into the rear slot of the brake cable bracket and tighten securely.

Fig. 8-243



AF462D

5. Insert the cable end into the rear slot of the clevis. Install the pin through the clevis and actuator arm; then install the washer. Install a new cotter pin into the clevis pin and spread the cotter pin.

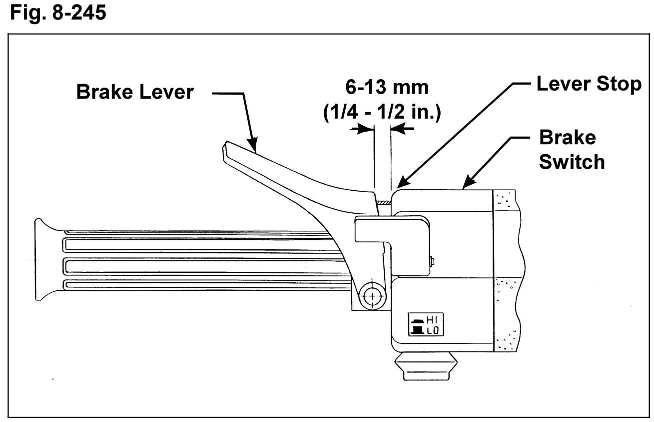
Fig. 8-244



AF340

6. Pull out on the quick-adjust knob and turn clockwise until there is 6-13 mm (1/4-1/2 in.) free-play at the brake lever.

Fig. 8-245

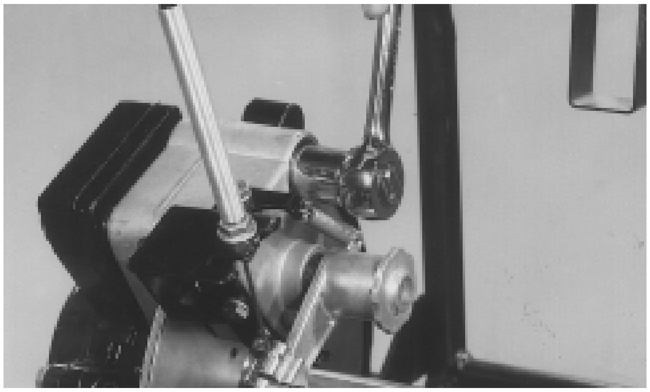


0727-451

7. Set the parking brake; then securely tighten the jam nut on the upper mounting cap screw.

8

Fig. 8-246



AF298

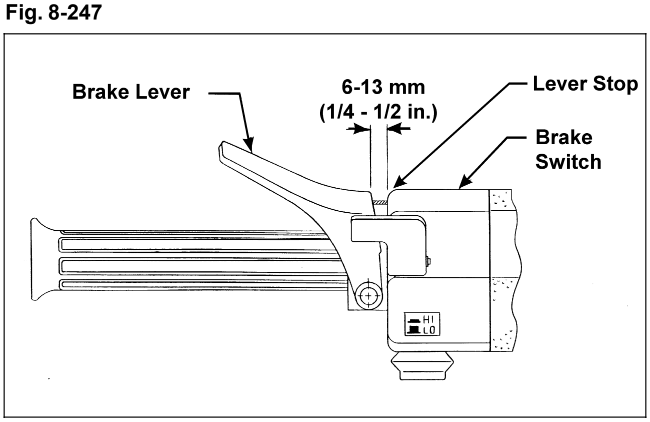
8. Release the parking brake and recheck the brake lever free-play (adjust as needed); then place the recoil starter rope into the guide portion of the brake cable bracket.

ADJUSTING BRAKE LEVER TRAVEL

1. Rotate the brake disc alternately forward and backward while slowly compressing the brake lever.

2. At the point where the disc is locked, check the distance between the brake lever and lever stop. The distance must be within a range of 6-13 mm (1/4-1/2 in.).

Fig. 8-247



0727-451

⚠ WARNING

Before making any adjustment, make certain the brake quick-adjust knob isn't hot. If the snowmobile has just been used, allow some time for the knob to cool or burns may result.

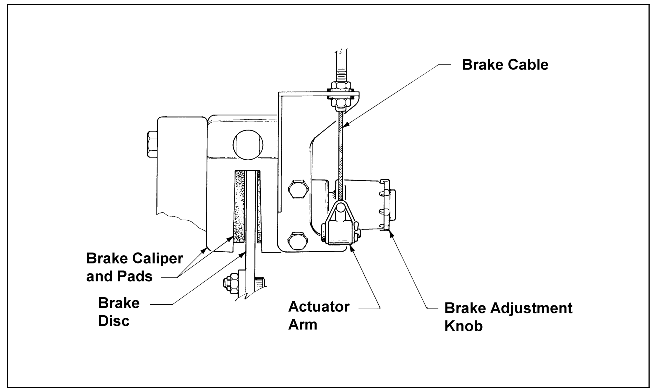
3. To decrease brake lever travel (set up brake), pull out on the spring-loaded quick-adjust knob and rotate the knob clockwise periodically checking the brake lever travel distance until the correct travel distance is attained. Once the correct brake lever travel has been obtained, release the knob into a secured position.

■ **NOTE: If the quick-adjust knob has reached its maximum adjustment (cannot be rotated any further clockwise), both brake pads must be replaced.**

⚠ WARNING

DO NOT attempt to adjust the brake with the flange nuts on the brake cable bracket. Incorrect brake adjustment may occur causing possible brake failure.

Fig. 8-248



0730-151

4. To increase brake lever travel (loosen the brake), pull out on the quick-adjust knob and rotate the knob counterclockwise periodically checking the brake lever travel. Once the desired brake lever travel is obtained, release the knob into a secured position.

REPLACING BRAKE PADS

⚠ CAUTION

The brake pads must be replaced as a set. Do not under any circumstances ever replace only one of the brake pads.

1. Using a 1/2-in. socket, remove the front brake assembly guide pin. Slowly pull the pin from the assembly and catch the alignment ball as it drops from the hole in the front of the caliper assembly.

2. Remove the rear guide pin; then slide the brake caliper assembly forward free of the brake disc.

3. Remove the stationary brake pad from the caliper assembly.

4. Tip the caliper on its side and allow the movable brake pad to drop free of the caliper assembly.

5. Place the new movable brake pad into position; then temporarily secure with a rubber band to hold it in place.

6. With the backing plate in position (wide tab positioned between the snap ring ears), install the stationary brake pad making sure the notch in the pad is aligned with small tab of the backing plate. Using a rubber band, temporarily secure the pad.

7. Place the brake assembly back into position over the brake disc. Apply green Loctite #609 to the rear guide pin; then install the rear guide pin.

8. Insert the alignment ball into the hole at the front of the caliper, apply green Loctite #609 to the front guide pin, and install the front guide pin. Tighten the two alignment pins to 4.2 kg-m (30 ft-lb). Cut and remove the two rubber bands.

■ **NOTE: When new brake pads have been installed, a "burnishing" process is required. Drive the snowmobile slowly and compress the brake lever repeatedly until the pads just start to heat up; then allow them to cool down. This process stabilizes the pad material and extends the life of the pads.**

Brake Control
(Mechanical System)

03

REMOVING AND DISASSEMBLING

1. Remove the Phillips-head screws securing the handlebar pad to the handlebar.

Fig. 8-249



AL136D

2. Remove the retaining ring, washer, and pin securing the brake lever.

Fig. 8-250



AL137D

Fig. 8-251



AL138D

3. Loosen the jam nut securing the brake cable to the brake cable bracket.

Fig. 8-252



AF462D

4. Disconnect the brake cable from the seat in the brake lever and remove the lever; then slide the brake cable free of the brake control.

8

Fig. 8-253



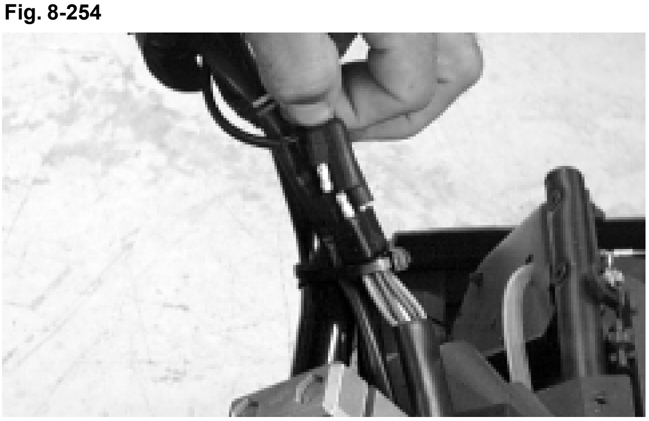
AL140D

5. Remove the brake lever from the brake control housing.

6. Remove the four screws securing the console; then raise the console to gain access to the main wiring harness.

7. Disconnect the brake control wiring harness from the main wiring harness.

Fig. 8-254



AL141D

8. Cut the cable ties holding the wiring harnesses and cables to the steering post noting their locations for installing purposes.

9. Using a sharp knife, cut the grip off the handlebar; then using a solvent, clean adhesive from the handlebar.

10. Remove the machine screw securing the brake control to the handlebar; then slide the brake control off the handlebar.

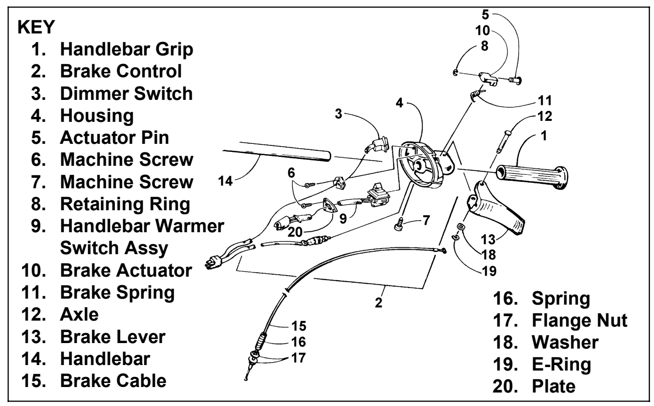
Fig. 8-255



AL143D

ASSEMBLING AND INSTALLING

Fig. 8-256



733-666B

1. Slide the brake control onto the handlebar and secure with the machine screw.

Fig. 8-257



AL143D

2. Connect the wiring harness at the console.

3. Connect the brake control wiring harness to the main wiring harness; then secure the harnesses with cable ties.

Fig. 8-258



AL141D

4. Place the console into position and secure with four screws making sure all wiring harnesses are positioned under the console.

■ NOTE: Secure wiring harnesses and cables to the steering post with cable ties as noted in removing.

5. Connect the end of the brake cable to the seat of the brake lever.

Fig. 8-259



AL140D

6. Secure the brake cable to the bracket by tightening the jam nut.

Fig. 8-260



AF462D

7. Secure the brake lever with the pin, washer, and retaining ring.

Fig. 8-261



AL138D

Fig. 8-262



AL137D

8. Secure the handlebar pad to the handlebar with the Phillips-head screws.

9. Apply Handlebar Grip Adhesive (p/n 0636-071) to the bore of the handlebar grip; then using a rubber hammer, drive the grip into position.

⚠ WARNING

The handlebar adhesive is extremely flammable. The product contains acetone and the vapors, when released, can be easily ignited. Keep away from heat, sparks, and open flame. Use only in a well-ventilated area. Avoid prolonged breathing of vapor. Avoid eye and skin contact. Keep container closed when not in use.

8

DRIVE SYSTEM SPECIFICATIONS

MODEL	ALTITUDE	DRIVE CLUTCH		DRIVE SPRING		CAM ARM		DRIVEN PULLEY	DRIVEN SPRING	
		TYPE	P/N	P/N	COLOR	P/N	GRAMS	P/N	P/N	COLOR
Panther 340	LOW	Arctic		0646-147	Yellow/Green	0746-502	44.5	0726-098	0148-227	Yellow
	5-9000		0725-293					(Roller		
	9-OVER					0746-526	42.0	Cam)		
Panther 440	LOW	Arctic		0646-149	Red	0746-527	50.5	0726-101	0148-227	Yellow
	5-9000		0725-301			0746-531	44.5	(Roller		
	9-OVER					0746-526	42.0	Cam)		
Panther 550	LOW	Arctic		0646-149	Red	0746-527	50.5	0726-088	0148-227	Yellow
	5-9000		0725-301	0646-147	Yellow/Green	0746-538	49.5	(Roller		
	9-OVER					0746-523	47.0	Cam)		
Z 440	LOW	Arctic		0646-149	Red	0746-501	48.5	0726-090	0648-012	Blue
	5-9000		0725-264			0746-525	44.0	(Roller	0148-227	Yellow
	9-OVER					0746-526	42.0	Cam)		
Z 370	LOW	Arctic		0646-147	Yellow/Green	0746-502	44.5	0726-090	0648-012	Blue
	5-9000		0725-265			0746-602	42.5	(Roller	0148-227	Yellow
	9-OVER							Cam)		
Bearcat 340	LOW	Arctic		0646-149	Red	0746-540	46.5	0726-037	0648-012	Blue
	5-9000		0725-254			0746-525	44.0	(Roller		
	9-OVER					0746-503	41.0	Cam)		
Bearcat 440 I	LOW	Arctic		0646-149	Red	0746-501	48.5	0726-037	0648-012	Blue
	5-9000		0725-285			0746-593	45.5	(Roller		
	9-OVER					0746-525	44.0	Cam)		
Bearcat 440 II	LOW	Arctic		0646-149	Red	0746-539	53.0	0726-083	0148-227	Yellow
	5-9000		0725-295			0746-538	49.5	(Roller		
	9-OVER					0746-523	47.0	Cam)		
Bearcat Wide Track	LOW	Arctic		0646-149	Red	0746-527	50.5	0726-102	0648-012	Blue
	5-9000		0725-296			0746-524	48.5	(Roller		
	9-OVER					0746-523	47.0	Cam)		
Pantera 1000	LOW	Arctic		0646-150	Silver	0746-588	54.5	0726-092	0148-227	Yellow
	5-9000		0725-304	0646-149	Red	0746-527	50.5	(Roller		
	9-OVER					0746-524	48.5	Cam)		
Pantera 580 EFI	LOW	Arctic		0646-149	Red	0746-527	50.5	0726-085	0148-227	Yellow
	5-9000		0725-301	0646-147	Yellow/Green	0746-524	48.5	(Roller		
	9-OVER					0746-591	44.0	Cam)		
ZL 440	LOW	Arctic		0646-147	Yellow/Green	0746-579	46.5	0726-088	0148-227	Yellow
	5-9000		0725-302			0746-594	44.5	(Roller		
	9-OVER					0746-562	42.0	Cam)		
ZL 500	LOW	Arctic		0646-229	Yellow/White	0746-579	46.5	0726-094	0148-227	Yellow
	5-9000		0725-290			0746-598	44.0	(Roller		
	9-OVER					0746-604	41.5	Cam)		
ZL 500 EFI	LOW	Arctic		0646-229	Yellow/White	0746-579	46.5	0726-106	0148-227	Yellow
	5-9000		0725-290			0746-598	44.0	(Roller		
	9-OVER					0746-604	41.5	Cam)		
ZRT 600	LOW	Arctic		0646-147	Yellow/Green	0746-582	48.5	0726-097	0148-227	Yellow
	5-9000		0725-303	0646-229	Yellow/White			(Roller		
	9-OVER					0746-596	44.5	Cam)		
ZRT 800	LOW	Arctic		0646-149	Red	0746-500	54.0	0726-072	0148-227	Yellow
	5-9000		0725-310	0646-147	Yellow/Green	0746-527	50.5	(Roller		
	9-OVER					0746-524	48.5	Cam)		
ZR 600	LOW	Arctic		0646-229	Yellow/White	0746-609	52.0	0726-100	0148-227	Yellow
	5-9000		0725-289			0746-524	48.5	(Roller		
	9-OVER					0746-549	46.0	Cam)		
Triple Touring 600	LOW	Arctic		0646-147	Yellow/Green	0746-582	48.5	0726-097	0148-227	Yellow
	5-9000		0725-303	0646-229	Yellow/White			(Roller		
	9-OVER					0746-596	44.5	Cam)		
ZR 500	LOW	Arctic		0646-229	Yellow/White	0746-579	46.5	0726-106	0148-227	Yellow
	5-9000		0725-290			0746-598	44.0	(Roller		
	9-OVER					0746-604	41.5	Cam)		

MODEL	ALTITUDE	TORQUE BRACKET P/N	TORQUE BRACKET DEGREE	GEAR RATIO	CHAIN PITCH	CHAIN P/N	DRIVE BELT P/N	ENGAGEMENT RPM	PEAK RPM
Panther 340	LOW	0648-002	53°	18/44	72	0107-372	0627-012	3800-4000	7000
	5-9000	0648-014	49°						
	9-OVER	0148-180	45°						
Panther 440	LOW	0148-222	51°	19/39	70	1602-041	0627-012	3500	7000
	5-9000								
	9-OVER								
Panther 550	LOW	0648-014	49°	19/39	70	1602-041	0627-021	3500	7800
	5-9000								
	9-OVER	0648-025	47°						8000
Z 440	LOW	0648-002	53°	20/39	70	0107-216	0627-021	3500	7000
	5-9000			19/40					
	9-OVER								
Z 370	LOW	0648-002	53°	18/44	72	0107-372	0627-021	3800	7200
	5-9000								
	9-OVER	0648-014	49°						
Bearcat 340	LOW	0648-014	49°	18/44	72	1602-042	0627-013	3500	7000
	5-9000	0648-026	42°						
	9-OVER								
Bearcat 440 I	LOW	0648-014	49°	18/40	70	1602-041	0627-014	3500	7000
	5-9000	0148-180	45°						
	9-OVER	0648-026	42°						
Bearcat 440 II	LOW	0148-180	45°	18/40	70	1602-041	0627-014	3500	7000
	5-9000	0648-026	42°						
	9-OVER								
Bearcat Wide Track	LOW	0648-025	47°	18/40	70	0602-968	0627-014	3500	7800
	5-9000								
	9-OVER	0148-180	45°						
Pantera 1000	LOW	0648-016	57°/50°	24/39	72	1602-042	0627-020	3500	8400-8500
	5-9000	0148-222	51°	19/39	70	1602-041		3800	
	9-OVER	0648-014	49°						
Pantera 580 EFI	LOW	0648-014	49°	19/39	70	1602-041	0627-020	3500	8000
	5-9000							4000	
	9-OVER								
ZL 440	LOW	0648-014	49°	20/39	70	1602-041	0627-021	4500	7800-8000
	5-9000			19/40					
	9-OVER								
ZL 500	LOW	0148-222	51°	20/39	70	1602-041	0627-020	4800	8500-8700
	5-9000	0648-014	49°	19/40					
	9-OVER							5000	
ZL 500 EFI	LOW	0648-126	53°/51°	20/39	70	1602-041	0627-020	4800	8500-8700
	5-9000	0648-014	49°	19/40					
	9-OVER							5000	
ZRT 600	LOW	0648-005	55°	23/40	72	1602-042	0627-020	4500	8500
	5-9000	0148-222	51°	20/39	70	1602-041		4800	
	9-OVER	0648-014	49°						
ZRT 800	LOW	0648-016	57°/50°	24/39	72	1602-042	0627-020	3500	8500
	5-9000	0648-024	55°/53°	20/39	70	1602-041		4200	
	9-OVER	0148-222	51°						
ZR 600	LOW	0648-024	55°/53°	20/39	70	1602-041	0627-020	4500	8100-8300
	5-9000	0148-222	51°	19/40				4800	8100-8400
	9-OVER	0648-014	49°					5000	
Triple Touring 600	LOW	0648-005	55°	23/40	72	1602-042	0627-020	4800	8500-8700
	5-9000	0148-222	51°	19/39	70	1602-041			
	9-OVER	0648-014	49°					5000	
ZR 500	LOW	0648-126	53°/51°	20/39	70	1602-041	0627-020	4800	8500-8700
	5-9000	0648-014	49°	19/40					
	9-OVER								

8

MODEL	ALTITUDE	DRIVE CLUTCH		DRIVE SPRING		CAM ARM		DRIVEN PULLEY	DRIVEN SPRING	
		TYPE	P/N	P/N	COLOR	P/N	GRAMS	P/N	P/N	COLOR
Powder Special 500 EFI/	LOW	Arctic		0646-229	Yellow/White	0746-579	46.5	0726-099	0148-227	Yellow
500 EFI LE	3-5000					0746-584	45.0			
	5-9000		0725-297			0746-602	42.5	(Roller		
	9-OVER					0746-590	40.5	Cam)		
Powder Special 600/600 LE	LOW	Arctic		0646-229	Yellow/White	0746-609	52.0	0726-099	0148-227	Yellow
	3-5000					0746-610	50.0			
	5-9000		0725-297					(Roller		
	9-OVER					0746-611	47.0	Cam)		
Powder Special	LOW	Arctic		0646-229	Yellow/White	0746-587	50.0	0726-104	0148-227	Yellow
600 EFI/600 EFI LE	3-5000					0746-524	48.5			
	5-9000		0725-298			0746-607	46.0	(Roller		
	9-OVER					0746-602	42.5	Cam)		
Powder Special 700/	LOW	Arctic		0646-149	Red	0746-539	53.0	0726-104	0148-227	Yellow
700 LE	3-5000			0646-147	Yellow/Green	0746-592	52.0			
	5-9000		0725-300			0746-527	50.5	(Roller		
	9-OVER			0646-229	Yellow/White	0746-585	49.0	Cam)		
ZL 600	LOW	Arctic		0646-229	Yellow/White	0746-609	52.0	0726-100	0148-227	Yellow
	5-9000		0725-289			0746-524	48.5	(Roller		
	9-OVER					0746-549	46.0	Cam)		
ZL 600 EFI	LOW	Arctic		0646-229	Yellow/White	0746-582	48.5	0726-100	0148-227	Yellow
	5-9000		0725-291			0746-607	46.0	(Roller		
	9-OVER					0746-597	43.5	Cam)		
Thundercat	LOW	Arctic	0725-308	0646-150	Silver	0746-539	53.0	0726-072	0148-227	Yellow
	5-9000			0646-149	Red	0746-527	50.5	(Roller		
	9-OVER					0746-524	48.5	Cam)		
Thundercat M/C	LOW	Arctic	0725-309	0646-150	Silver	0746-588	54.5	0726-072	0148-227	Yellow
	5-9000			0646-149	Red	0746-600	50.0	(Roller		
	9-OVER					0746-608	47.5	Cam)		
ZR 500 EFI	LOW	Arctic		0646-229	Yellow/White	0746-579	46.5	0726-106	0148-227	Yellow
	5-9000		0725-290			0746-598	44.0	(Roller		
	9-OVER					0746-604	41.5	Cam)		
ZR 600 EFI/	LOW	Arctic		0646-229	Yellow/White	0746-582	48.5	0726-100	0148-227	Yellow
600 EFI LE	5-9000		0725-291			0746-607	46.0	(Roller		
(Clicker/Reverse)	9-OVER					0746-597	43.5	Cam)		
ZR 700/700 LE	LOW	Arctic		0646-149	Red	0746-539	53.0	0726-089	0148-227	Yellow
(Clicker/Reverse)	5-9000		0725-292	0646-147	Yellow/Green	0746-527	50.5	(Roller		
	9-OVER					0746-585	49.0	Cam)		
ZL 550	LOW	Arctic		0646-149	Red	0746-527	50.5	0726-085	0148-227	Yellow
	5-9000		0725-301	0646-147	Yellow/Green	0746-524	48.5	(Roller		
	9-OVER					0746-523	47.0	Cam)		
ZL 580 EFI	LOW	Arctic		0646-149	Red	0746-527	50.5	0726-085	0148-227	Yellow
	5-9000		0725-301	0646-147	Yellow/Green	0746-524	48.5	(Roller		
	9-OVER					0746-523	47.0	Cam)		
ZL 700	LOW	Arctic		0646-149	Red	0746-539	53.0	0726-089	0148-227	Yellow
	5-9000		0725-292	0646-147	Yellow/Green	0746-527	50.5	(Roller		
	9-OVER					0746-585	49.0	Cam)		

MODEL	ALTITUDE	TORQUE BRACKET		GEAR RATIO	CHAIN		DRIVE BELT	ENGAGEMENT	PEAK RPM
		P/N	DEGREE		PITCH	P/N	P/N	RPM	
Powder Special 500 EFI/	LOW	0648-014	49°	19/40	70	1602-041	0627-020	4800	8500-8700
500 EFI LE	3-5000								
	5-9000							5000	
	9-OVER								
Powder Special 600/600 LE	LOW	0648-016	57°/50°	19/40	70	1602-041	0627-020	4800	8100-8400
	3-5000	0648-002	53°	18/40					
	5-9000	0648-014	49°						
	9-OVER								
Powder Special	LOW	0148-222	51°	19/40	70	1602-041	0627-020	4800	8400-8600
600 EFI/600 EFI LE	3-5000								
	5-9000								
	9-OVER	0648-014	49°						
Powder Special 700/	LOW	0148-222	51°	20/39	70	1602-041	0627-020	3500	7800-8000
700 LE	3-5000							4000	
	5-9000			19/40					
	9-OVER								
ZL 600	LOW	0648-024	55°/53°	20/39	70	1602-041	0627-020	4700	8100-8400
	5-9000	0148-222	51°	19/40				4800	
	9-OVER	0648-014	49°					5000	
ZL 600 EFI	LOW	0648-024	55°/53°	20/39	70	1602-041	0627-020	4800	8400-8600
	5-9000	0648-014	49°	19/40					
	9-OVER								
Thundercat	LOW	0648-016	57°/50°	24/39	72	1602-042	0627-020	3500	8500
	5-9000			20/39	70	1602-041		3800	
	9-OVER	0648-014	49°					3500	
Thundercat M/C	LOW	0648-016	57°/50°	20/39	70	1602-041	0627-020	3500	8500
	5-9000							3800	
	9-OVER	0148-222	51°						
ZR 500 EFI	LOW	0648-126	53°/51°	20/39	70	1602-041	0627-020	4800	8500-8700
	5-9000	0648-014	49°	19/40					
	9-OVER							5000	
ZR 600 EFI/	LOW	0648-024	53°	20/39 (19/39-R)	70	1602-041	0627-020	4800	8400-8600
600 EFI LE	5-9000	0648-014	49°	19/40 (19/39-R)					
(Clicker/Reverse)	9-OVER								
ZR 700/700 LE	LOW	0648-002	53°	23/40	72	1602-042	0627-020	3500	7900-8100
(Clicker/Reverse)	5-9000	0648-024	55°/53°	19/40 (19/39-R)	70	1602-041		4000	
	9-OVER								
ZL 550	LOW	0648-014	49°	19/39	70	1602-041	0627-021	3500	7800-8000
	5-9000							4200	
	9-OVER	0648-025	47°						
ZL 580 EFI	LOW	0648-014	49°	19/39	70	1602-041	0627-020	3500	8000
	5-9000							4200	
	9-OVER								
ZL 700	LOW	0648-002	53°	23/40	72	1602-042	0627-020	3500	7900-8100
	5-9000	0648-024	55°/53°	19/40	70	1602-041		4000	
	9-OVER								

CHAIN CASE PERFORMANCE SPECIFICATIONS WITH TENSION PAD TIGHTENER SYSTEM

CHAIN CASE PERFORMANCE SPECIFICATIONS*					MPH/RPM (Engine)				
SPROCKETS	RATIO	CHAIN PITCH	TENSION SPRING CLIPS**	TENSION PADS***	6000	7000	8000	9000	10,000
24/35	.686	70	2L	2TK	79.0	92.2	105.4	118.5	131.7
22/33	.667	68	2L	2TK	76.8	89.6	102.5	115.3	128.1
21/33	.636	68	2S	2TK	73.3	85.5	97.7	109.9	122.1
24/39	.615	72	2L	2TK	70.8	82.7	94.5	106.3	118.1
22/37	.595	70	2L	2TN	68.5	80.0	91.4	102.8	114.2
20/35	.571	68	2L	2TK	65.8	76.7	87.7	98.7	109.6
21/37	.568	70	2L	2TK	65.4	76.3	87.2	98.2	109.1
19/35	.543	68	2S	2TN	62.6	73.0	83.4	93.8	104.3
20/39	.513	70	2L	2TK	59.1	68.9	78.8	88.6	98.5
21/41	.512	72	2S	2TN	59.0	68.8	78.6	88.4	98.3
20/41	.488	72	2S	2TN	56.2	65.6	75.0	84.3	93.7
18/37	.486	68	2L	2TN	56.0	65.3	74.6	84.0	93.3
16/33	.484	66	2L	2TK	55.8	65.0	74.3	83.6	92.9
19/41	.463	72	2L	2TK	53.3	62.2	71.1	80.0	88.9
18/39	.461	70	2S	2TN	53.2	62.1	71.0	79.8	88.7
17/37	.459	68	2L	2TK	52.9	61.7	70.5	79.3	88.1

* **USE AS A GUIDE ONLY**

(MPH = 0.0192 x RPM x Ratio)

** SPRING CLIPS: L-p/n 0107-236, S-p/n 0107-235

*** TENSION PADS: Thick-p/n 0107-411, Thin-p/n 0107-228

■ **NOTE: MPH must be multiplied by 1.12 to compensate for Arctic Cat overdrive clutch.**
Example: 20/39 at 8000 RPM = 78.8 x 1.12 = 88.3.

CHAIN CASE PERFORMANCE SPECIFICATIONS WITH ROLLER TIGHTENER SYSTEM

CHAIN CASE PERFORMANCE SPECIFICATIONS*					MPH/RPM (Engine)				
SPROCKETS	RATIO	CHAIN PITCH	TENSION SPRING P/N	ROLLER	6000	7000	8000	9000	10,000
18/44	.409	72	0707-026	Roller	47.1	53.7	61.4	69.2	76.8
18/40	.450	70	0707-026	Roller	51.8	60.4	69.1	77.8	86.4
19/40	.475	70	0702-130	Roller	54.0	63.0	72.0	81.2	90.0
23/40	.575	72	0702-130	Roller	65.6	76.6	87.5	98.4	109.0
24/39	.615	72	0702-130	Roller	70.8	82.6	94.5	106.3	118.0
20/39	.513	70	0702-130	Roller	59.1	68.9	78.8	88.6	98.5
19/39	.487	70	0707-026	Roller	56.1	65.5	74.8	84.2	93.5

* **USE AS A GUIDE ONLY**

DRIVE SYSTEM COMPONENTS

Below is a list of Comet Drive Clutch, Arctic Drive Clutch, and Driven Pulley components that are available through the Arctic Cat Parts Department. Hopefully, this information will be useful when doing any fine-tuning on the drive system. Now there is virtually a cam arm weight for all needs.

SPRINGS - ARCTIC DRIVEN

p/n	Color	Rate @ 1 7/16"
0748-025	Green	157 lbs.
0648-114	Red/White	113 lbs.
0148-227	Yellow	92 lbs.
0648-012	Blue	79 lbs.
0648-010	White	58 lbs.
0148-176	Black	42 lbs.

SPRINGS - COMET DRIVE

p/n	Color	Rate @ 2 3/8"	Rate @ 1 3/8"
0646-154	Purple	136	254
0146-526	Yellow/Green	134	264
0646-083	Red	92	222
0646-097	Blue/Red	68	197
0646-084	White	78	178
0646-096	Silver	85	169
0646-192	Orange	120	270

ARCTIC CAT DRIVE CLUTCH SPRING CHART

	p/n	Rate @ 2 9/16 in.	Rate @ 1 5/16 in.	Color
LIGHT	0646-148	53 lb	224 lb	Red/Blue
	0646-150	72 lb	188 lb	Silver
	0646-149	74 lb	228 lb	Red
	0646-147	114 lb	267 lb	Yellow/Green
	0646-155	121 lb	240 lb	Purple
	0646-229	122 lb	285 lb	Yellow/White
HEAVY	0646-248	143 lb	290 lb	Orange/White

■ **NOTE: The Arctic Cat drive clutch spring has a smaller O.D. than the Comet and cannot be interchanged.**

COMET CAM ARMS

p/n	Grams
0646-085	40.0
0646-030	41.0
0646-019	42.0
0646-015	43.5
0646-018	43.5
0646-079	44.0
0146-525	44.0
0646-002	44.0
0646-162	44.0
0646-027	44.5
0146-530	44.5

p/n	Grams
0646-156	45.0
0646-078	45.0
0646-009	46.5
0646-021	46.5
0646-199	46.5
0646-115	47.0
0646-157	47.5
0146-514	48.0
0646-031	48.5
0646-080	48.5
0646-124	49.5

p/n	Grams
0646-164	49.5
0646-105	50.5
0646-102	50.5
0646-100	52.5
0646-165	51.5
0646-117	53.0
0646-099	54.0
0646-163	54.0
0646-098	56.5
0646-249	50.0
0646-250	44.5

ARCTIC CAT DRIVE CLUTCH CAM ARMS

p/n	Grams	p/n	Grams
0746-500	54.0	0746-565	43.5
0746-501	48.5	0746-566	48.0
0746-502	44.5	0746-568	50.0
0746-503	41.0	0746-570	47.0
0746-523	47.0	0746-579	46.5
0746-524	48.5	0746-581	52.5
0746-525	44.0	0746-582	48.5
0746-526	42.0	0746-583	46.5
0746-527	50.5	0746-584	45.0
0746-528	46.5*	0746-585	49.0
0746-529	49.5*	0746-586	45.0*
0746-530	53.5*	0746-587	50.0
0746-531	44.5	0746-588	54.5
0746-532	44.0*	0746-589	45.0
0746-533	47.5*	0746-590	40.5*
0746-534	51.5*	0746-591	44.0
0746-535	52.5	0746-592	52.0
0746-536	45.0*	0746-593	45.5
0746-537	39.5*	0746-594	44.5
0746-538	49.5	0746-595	41.5
0746-539	53.0	0746-596	44.5
0746-540	46.5	0746-597	43.5
0746-546	48.0	0746-598	44.0
0746-549	46.0	0746-600	50.0
0746-559	55.5	0746-602	42.5
0746-560	55.0	0746-604	41.5
0746-561	50.0	0746-605	52.0
0746-562	42.0	0746-606	48.4
		0746-607	46.0
		0746-608	47.5
		0746-609	52.0
		0746-610	50.0
		0746-611	47.0

* Notched Cam Arm

DRIVEN CAMS

p/n	Degree
0148-222	51
0648-001	52/44
0648-002	53
0648-005	55
0648-006	57
0148-180	45
0648-011	48/44
0648-014	49
0648-016	57/50
0648-026	42
0648-025	47
0648-024	55/53
0648-107*	57/50
0648-125	51/49
0648-126	53/51

* Base is 0.100 thicker than that of p/n 0648-016. Used on 1999 800 cc.

ARCTIC CAT CAM ARMS



ARCTIC CAT CAM ARMS



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COMET CAM ARMS



COMET-TO-ARCTIC CAT CAM ARM CONVERSION CHART

COMET P/N	ARCTIC CAT P/N
0646-085	N/A
0646-030	0746-503
0646-019	0746-526
0646-018	N/A
0146-525	N/A
0646-002	N/A
0646-079	0746-525
0646-250	N/A

COMET P/N	ARCTIC CAT P/N
0146-530	0746-531
0646-027	0746-502
0646-078	N/A
0646-156	0746-536
0646-009	N/A
0646-021	0746-540
0646-199	0746-528

COMET P/N	ARCTIC CAT P/N
0646-123	N/A
0646-157	0746-533
0646-080	0746-524
0646-031	0746-501
0646-124	0746-538
0646-164	0746-529
0646-102	0746-527

COMET P/N	ARCTIC CAT P/N
0646-165	0746-534
0646-100	0746-535
0646-117	0746-539
0646-099	0746-500
0646-163	0746-530
0646-098	N/A
0646-249	N/A

CHAINS & SPROCKETS 1984 - 2000

For reference, all spockets and chains available from Arctic Cat are listed below.

■ **NOTE: Added to the list are wide 15 link chains with corresponding wide sprockets. These chains and sprockets are 3 mm (1/8 in.) wider than the 13 link chains and corresponding sprockets and approximately 25% stronger.**

UPPER SPROCKETS	
NUMBER OF TEETH	P/N
15	0107-217
16	0107-340
17	0107-218
18	0107-341
19	0107-219
20	0107-409
21	0107-408
22	0107-301
23	0602-363
24	0107-508

LOWER SPROCKETS	
NUMBER OF TEETH	P/N
33	0107-513
35	0107-325
37	0107-407
39	0107-220
40	0107-903
41	0107-369

STANDARD CHAINS	
PITCH	P/N
64	0107-322
66	0107-358
68	0107-215
70	0107-216
70*	0602-371
72	0107-372

* Reverse and 2-Speed Chain

WIDE CHAIN (13 Link)	
PITCH	P/N
68	0602-495
70	1602-041
72	1602-042
WIDE CHAIN (15 Link)	
68	1602-036
70	0602-968
72	0602-972
74	1602-037

WIDE SPROCKET (w/13 Link Chain) (UPPER)	
NUMBER OF TEETH	P/N
18	0602-445
19	0602-444
20	0602-456
21	0602-494
22	0602-455
23	0602-452
24	0602-446
19*	0602-470
WIDE SPROCKET (w/15 Link Chain) (UPPER)	
20	0602-967
18	0602-995
19	0602-973
24	0602-974

WIDE SPROCKET (w/13 Link Chain) (LOWER)	
NUMBER OF TEETH	P/N
35	0602-457
39	0602-451
40	0602-453
39*	0702-170
40*	0702-187
42	0602-909
44	0602-812
44*	0602-813
WIDE SPROCKET (w/15 Link Chain) (LOWER)	
35*	0602-142
39*	0702-370
40*	0702-354

* Reverse and 2-Speed Sprocket

ARCTIC CAT DRIVE BELT DIMENSION CHART

BELT P/N	LENGTH	WIDTH
0100-022	41 3/8 ± 3/64 inch	1 3/16 inch
0100-032	43 1/2 ± 3/64 inch	1 3/16 inch
0100-042	46 3/4 ± 3/64 inch	1 3/16 inch
0100-043	46 9/16 ± 3/64 inch	1 3/16 inch
0100-066	45 7/16 ± 3/64 inch	1 3/16 inch
0100-080	44 1/8 ± 3/8 inch	1 3/16 inch
0100-088	43 1/8 ± 3/16 inch	1 3/16 inch
0100-092	43 13/16 ± 3/16 inch	1 1/4 inch
0227-002	47 1/2 ± 3/16 inch	1 1/4 inch
0227-007	43 1/4 ± 3/16 inch	1 1/4 inch
0227-010	49 ± 3/16 inch	1 1/4 inch
0227-011	44 ± 3/16 inch	1 1/4 inch
0227-014	45 1/2 ± 3/16 inch	1 1/4 inch
0227-016	45 1/16 ± 3/16 inch	1 1/4 inch
0227-017	42 13/16 ± 3/16 inch	1 1/4 inch
0227-019	43 1/4 ± 3/16 inch	1 1/4 inch
0227-020	46 11/16 ± 3/16 inch	1 1/4 inch
0227-022	45 1/2 ± 3/16 inch	1 1/4 inch
0227-023	45 7/16 ± 1/8 inch	1 1/4 inch
0227-026	43 1/4 ± 3/16 inch	1 1/4 inch
0227-027	43 1/4 ± 3/16 inch	1 1/4 inch
0227-030	43 1/2 ± 3/16 inch	1 3/8 inch
0227-032	43 5/8 ± 3/16 inch	1 3/8 inch
0227-100	45 1/2 ± 3/16 inch	1 3/8 inch
0227-101	43 5/16 ± 3/16 inch	1 3/8 inch
0227-103	43 5/8 ± 3/16 inch	1 3/8 inch
*0627-001	43 5/8 ± 3/16 inch	1 3/8 inch
*0627-002	43 3/8 ± 3/16 inch	1 3/8 inch
*0627-004	43 5/16 ± 3/16 inch	1 3/8 inch
*0627-006	43 5/8 ± 3/16 inch	1 3/8 inch
*0627-008	45 3/4 ± 3/16 inch	1 3/8 inch
**0627-009	47 3/4 ± 3/16 inch	1 3/8 inch
***0627-010	47 3/4 ± 3/16 inch	1 3/8 inch
**0627-011	45 3/4 ± 3/16 inch	1 3/8 inch
**0627-012	47 3/4 ± 3/16 inch	1 3/8 inch
0627-013	49 ± 3/16 inch	1 7/16 inch
0627-014	49 ± 3/16 inch	1 7/16 inch
***0627-020	47 3/4 ± 3/16 inch	1 13/32 inch
**0627-021	47 3/4 ± 3/16 inch	1 13/32 inch

* High Performance Belt

** Double-Cog High Performance Belt

*** Double-Cog High Performance Belt w/Hard Compound

ARCTIC CAT DRIVE BELT REPLACEMENT CHART

1967
Panther P8, P12, P15 0100-022

1968
Cougar 0100-022
Panther P-20 w/o Kohler Eng. 0100-032
w/Kohler Eng. 0100-022

1969
Panther Models, P35H 0100-042
P17J, P19J, K or S, P22J or H 0100-043
P12K, P19H, P20W, P23K 0100-066
P17H. 0100-080
P27H. 0100-088

1970
Panther P246, P292, P295,
P340 Eng. 0100-080
P303, P299 Eng. 0100-088
P440 Eng. 0100-092
P634, P760, P793 Eng. 0100-042

1971
Panther & Puma
P303 (303cc), P340,
PM340 (340cc) 0100-088
P399, PM399 (398cc), P440,
PM440 (436cc) 0100-092
P650, PM650 (634cc). 0100-042
Lynx L295 (292cc), L303 (303cc),
L340 (340cc). 0100-080
Ext E295 (292cc) 0100-088
E340 (339cc), E399 (398cc),
E440 (436cc). 0100-092

1972
Lynx 292AL, Panther 292AP
Kawasaki KT 150B). 0100-080
Puma 340APU, Cheetah 340AC,
Panther 340AP (Kawasaki TIA 340S1),
Panther 303WP
(Wankel KM 914) 0100-088
Puma 399APU, Cheetah 399AC,
Panther 399AP (Kawasaki TIA 400S1),
Cheetah 440AC, Panther 440AP
(Kawasaki TIA 440S1). 0100-092
Ext (All Engines) 0227-002

1973
Lynx 292 0100-080
Puma 440 0100-092
Cheetah 340 . . . . . 0227-007 *
Cheetah 400, 440 . . . . . 0227-007 *
Panther 340 . . . . . 0227-007 *
Panther 400, 440 . . . . . 0227-007 *
Panther Wankel. 0100-088
El Tigre 250, 340. 0227-011
El Tigre 400, 440. 0227-011
Ext 290, 340 0227-020
Ext 440, 650 0227-020

1974
Lynx I 292 0227-011
Lynx I 295 . . . . . 0227-007 *
Lynx II 340, 440 . . . . . 0227-007 *
Cheetah 340, 440 . . . . . 0227-007 *
Panther 295W, 340, 440 . . . . . 0227-007 *
El Tigre 295, 340, 400, 440. 0227-014

1975
El Tigre Z, 340, 440 0227-020
Pantera . . . . . 0227-007 *
Lynx 250 0227-017
Cheetah 295 0227-016
Cheetah 340, 440 0227-007
Panther 340, 440 0227-007
Jag 340 0227-014

1976
El Tigre 4000, 5000. 0227-020
Pantera 5000 0227-020
Panther 4000 . . . . . 0227-007 *
Cheetah 4000 . . . . . 0227-007 *
Panther 5000 0227-019
Cheetah 5000 0227-019
Jag 2000, 3000 0227-014
Lynx 250 0227-017
Arctic Z 0227-022
Cross Country Cat 0227-020

1977
El Tigre 4000, 5000 0227-020
Pantera 5000F/A, 5000F/C 0227-020
Panther 4000 . . . . . 0227-007 *
Panther 5000 0227-019
Cheetah 4000 0227-019
Jag 3000 0227-014
Lynx 2000T, 2000S . . . . . 0227-007 *

1978
Lynx 2000S, 2000T . . . . . 0227-007 *
Jag 2000, 3000 0227-014
Panther 4000 . . . . . 0227-007 *
Panther 5000 0227-019
Cheetah 5000 0227-019
El Tigre 5000F/A, 6000L/C. 0227-019
Pantera 5000F/A, 5000F/C 0227-020

1979
Lynx 2000S, 2000T . . . . . 0227-007 *
Jag 2000, 3000, FC/OI. 0227-014
Panther 5000F/C 0227-019
El Tigre 5000F/A, 6000L/C. 0227-019
Pantera 5000F/C 0227-020
Trail Cat 0227-019
El Tigre 340 & 440
Special Edition 0227-026

1980
Lynx 2000S, 2000T . . . . . 0227-007 *
Jag 2000, 3000, 3000F/C 0227-014
Trail Cat 3000, 4000. 0227-019
Panther, Pantera,
El Tigre 5000, 6000 0227-019

1981
Jag 0227-014
Trail Cat 0227-019
Panther, Pantera 0227-019
El Tigre 5000 0227-030
El Tigre 6000 0227-032

1984
Panther. 0227-030
El Tigre 6000 0227-032

1985
Jag 0227-100
Panther, Pantera 0227-030
Cougar. 0227-030
El Tigre 6000 0227-032

1986
Jag 0227-100
Panther, Pantera 0227-030
Cougar, Cheetah F/C. 0227-030
El Tigre, Cheetah L/C. 0227-032

1987
Jag 340, 440 0227-100
Super Jag. 0227-030
Panther, Pantera 0227-030
Cougar, Cheetah F/C. 0227-030
El Tigre 5000, 6000 0227-032
Cheetah L/C. 0227-032

1988
Jag 340, 440, Jag Deluxe 0227-100
Super Jag, Panther 0227-030
Cougar, Pantera. 0227-101
El Tigre 5000, 6000 0227-101
Cheetah Touring, L/C 0227-101
Wildcat 650 0627-004

1989
Jag 340, Jag Deluxe 0227-100
Super Jag, Jag AFS. 0227-032
Panther, Cougar. 0227-032
Pantera, Cheetah Touring 0227-032
El Tigre 6000, EXT. 0227-032
Wildcat 650 0627-001

1990
Jag 340 0227-100
Jag Mountain Cat. 0227-100
Panther, Jag AFS. 0227-103
Cougar, Cheetah Touring 0227-103
Pantera, El Tigre EXT 0227-103
Wildcat 650 0627-006
Prowler. 0227-103

1991
Lynx. 0227-030
Jag AFS, Panther 0227-103
Jag Long Track 0227-103
Super Jag 0227-103
Jag 340 Mountain Cat. 0227-100
Cougar, Cheetah Touring 0227-103
Pantera, Prowler 0227-103
El Tigre EXT 0227-103
Prowler Special 0227-103
EXT Special 0227-103
Wildcat 700 0627-006

1992
Jag, Jag Special 0227-103
Super Jag 0227-103
Jag AFS L/T 0227-103
Cheetah. 0227-103
Cougar 0227-103
Lynx, Lynx Deluxe 0227-030
Lynx Mountain Cat 0227-103
Pantera 0227-103
Prowler, Prowler Special 0227-103
EXT, EXT Special 0227-103
Panther 0227-103
Wildcat (AWS). 0627-008
Wildcat EFI (AFS) 0627-006

1993
Jag, Jag 440 Z. 0227-103
Jag AFS L/T 0227-103
Cheetah. 0227-103
Cougar 0227-103
Lynx, Lynx Deluxe 0227-030
Lynx Mountain Cat 0227-103
Pantera 0227-103
Prowler, Prowler 440Z. 0227-103
EXT, EXT 580 Z 0227-103
Panther 0227-103
Wildcat 0627-011
Thundercat 0627-010
ZR Models. 0627-012

1994
Puma, Puma Deluxe, Puma 2-Up 0227-103
Jag, Jag 440Z 0227-103
Cheetah Models 0227-103
Cougar 0227-103
Pantera 0227-103
Prowler EFI 0227-103
EXT 580 Models 0627-012
Panther Deluxe 0227-103
Wildcat EFI 0627-011
ZR Models. 0627-012
Thundercat 0627-010

1995
Puma, Puma Deluxe, Puma 2-Up 0227-103
Jag, Jag Deluxe. 0227-103
Panther 0227-103
Bearcat 340. 0627-013
Bearcat 440 & 550 0627-014
Cougar 0627-012
Prowler 0627-012
Pantera 0627-012
EXT. 0627-012
EXT Powder Special 0627-010
Wildcat, Wildcat Touring 0627-010
Thundercat 0627-010
Z440 0627-012
ZR440, ZR580. 0627-012
ZR700 0627-010
ZRT800 0627-010

Extended life drive belts for high altitude operation are available under the following part numbers:

Standard Belt		Extended Life Belt
0227-030	=	0627-002
0227-032	=	0627-001
0227-100	=	0627-003
0227-101	=	0627-004
0227-103	=	0627-006
0627-008	=	0627-011

* Also Available in Kevlar (Fiber B) Material — part 0227-019

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ARCTIC CAT DRIVE BELT REPLACEMENT CHART

(Continued)

1996

Model	Belt
Puma, Puma Deluxe, Puma 2-Up	0227-103
Jag, Jag Deluxe, Jag L/C	0227-103
Z440, Panther Deluxe, Panther L/C	0627-012
Bearcat 340	0627-013
Bearcat 440 & 550	0627-014
Cougar, Cougar 2-Up, Cougar M/C	0627-012
Pantera	0627-012
EXT EFI Models	0627-012
EXT 580	0627-012
EXT 580 Powder Special	0627-010
Wildcat Models	0627-010
Thundercat, ZRT 800, ZRT 600	0627-010
ZR 580 Models, ZR440	0627-012

1997

Model	Belt
Puma, Puma Deluxe, Puma 2-Up	0627-012
Jag, Jag Deluxe	0627-012
Panther, Panther L/C	0627-012
Z440, ZL440	0627-012
Bearcat 340	0627-013
Bearcat 440 & 550	0627-014
Cougar, Cougar M/C	0627-012
Pantera	0627-012
EXT EFI Models	0627-012
Powder Special EFI	0627-012
Thundercat, ZRT 800, ZRT 600	0627-010
ZR 580, ZR440	0627-010
EXT 600, Powder Extreme	0627-010
Powder 580 Carb	0627-010

1998

Model	Belt
Jag 340, Panther 340	0627-012
Jag 440, Jag 440 DLX	0627-012
Z 440, Panther 440	0627-012
Panther 550	0627-021
Bearcat 340	0627-013
Bearcat 440, Bearcat Wide Track	0627-014
Cougar, Cougar DLX, Cougar M/C	0627-021
Pantera 580	0627-021
Pantera 800	0627-020
EXT EFI	0627-020
EXT EFI DLX	0627-021
EXT 600, EXT 600 Touring	0627-020
Powder Special, Powder Special EFI	0627-020
Powder Extreme	0627-020
Thundercat, Thundercat M/C	0627-020
ZRT 600, ZRT 800	0627-020
ZR 600, ZR 600 EFI	0627-020
ZL 440	0627-021
ZL 500, ZR 500	0627-020
ZR 440	0627-020

1999

Model	Belt
Jag 340 DLX, Panther 340	0627-012
Jag 440, Jag 440 DLX	0627-012
Panther 440	0627-012
Panther 550	0627-021
Bearcat 340, Bearcat 440 I	0627-013
Bearcat 440 II, Bearcat Wide Track	0627-014
Pantera 580 EFI	0627-021
Pantera 800	0627-020
Triple Touring 600	0627-020
Powder Special 500 EFI	0627-020
Powder Special 600 Models	0627-020
Powder Special 700	0627-020
Thundercat, Thundercat M/C	0627-020
Z 370	0627-021
Z 440	0627-021
ZL 440	0627-021
ZL 500 Models, ZL 600 Models	0627-020
ZR 500 Models	0627-020
ZR 600 Models	0627-020
ZR 700	0627-020
ZRT 600, ZRT 800	0627-020

2000

Model	Belt
Bearcat 340	0627-013
Bearcat 440 I/440 II/Wide Track	0627-014
Pantera Models	0627-020
Panther 340/440	0627-012
Panther 550	0627-021
Powder Special Models	0627-020
Thundercat Models	0627-020
Triple Touring 600	0627-020
Z Models	0627-021
ZL 440/550	0627-021
ZL 500/580/600/700	0627-020
ZR Models	0627-020
ZRT Models	0627-020

CENTER-TO-CENTER/OFFSET SPECIFICATIONS

YEAR	MODELS	CENTER-TO-CENTER cm	CENTER-TO-CENTER in.	OFFSET mm	OFFSET in.
1972	Lynx 292, Panther 292	28.9	11.375	4.52	0.178
	Puma 340, Cheetah 340, Panther 303W, Panther 340	27.6	10.875	4.52	0.178
	Puma 399, 440, Cheetah 399, 440, Panther 399, 440	27.6	10.875	4.52	0.178
1973	Lynx 292	28.9	11.375	4.52	0.178
	All El Tigre	28.9	11.375	8.13	0.320
	All others	27.6	10.875	8.13	0.320
1974	Lynx I 292	28.9	11.375	8.13	0.320
	Panther 295W, Lynx I 292W Lynx II 340, Lynx II 440	27.6	10.875	8.13	0.320
	Panther 340, 440, Cheetah 340, 440	25.9	10.200	9.65	0.300
	All El Tigre	28.9	11.375	9.65	0.380
1975	Lynx 250	27.3	10.750	10.49	0.413
	Jag 340	28.9	11.375	11.53	0.454
	Panther 340, 440, Cheetah 340, 440, Pantera 340, 440	25.9	10.200	11.53	0.454
	All El Tigre	30.5	12.000	11.53	0.454
1976	Jag 275, 340	28.9	11.375	11.53	0.454
	Panther 4000, 5000, Cheetah 4000, 5000	25.9	10.200	11.53	0.454
	Pantera, All El Tigre	30.5	12.000	11.53	0.454
1977	Lynx 2000S, 2000T, Panther 4000, 5000, Cheetah 5000	25.9	10.200	11.53	0.454
	Jag 3000	28.9	11.375	11.53	0.454
	El Tigre 4000, 5000, Pantera F/C, F/A	30.5	12.000	11.53	0.454
1978	Lynx 2000S, 2000T, Panther 4000, 5000, Cheetah 5000, El Tigre 5000, 6000	25.9	10.200	11.53	0.454
	Jag 2000, 3000	28.9	11.375	11.53	0.454
	Pantera F/C, F/A	30.5	12.000	11.53	0.454
1979	Lynx 2000S, 2000T Panther, El Tigre 5000, 6000, Trail Cat	25.9	10.200	11.53	0.454
	All Jag	28.9	11.375	11.53	0.454
	Pantera	30.5	12.000	11.53	0.454
1980	Lynx 2000S, 2000T, Trail Cat 3000, 4000, Panther, Pantera, El Tigre 5000	25.9	10.200	11.53	0.454
	El Tigre 6000	25.9	10.200	10.54	0.415
	All Jag	28.9	11.375	11.53	0.454
1981	Jag	28.9	11.375	11.53	0.454
	Trail Cat, Panter, Pantera	25.9	10.200	11.53	0.454
	El Tigre 5000, 6000	25.9	10.200	34.67	1.365
1984	Panther, El Tigre	25.9	10.200	34.67	1.365
1985	Jag	28.9	11.375	34.67	1.365
	Panther, Pantera, Cougar, El Tigre	25.9	10.200	34.67	1.365
1986	Jag	28.9	11.375	34.67	1.365
	Panther, Cougar, Pantera, El Tigre, Cheetah F/C, L/C	25.9	10.200	34.67	1.365
1987	Jag	28.9	11.375	34.67	1.365
	Super Jag, Panther, Cougar, Pantera, El Tigre 5000, 6000, Cheetah F/C, L/C	25.9	10.200	34.67	1.365
1988	Jag 340, 440	28.7	11.300	34.67	1.365
	Super Jag, Panther, Cougar, Pantera, El Tigre 5000, 6000, Cheetah Touring, L/C, Wildcat 650	25.9	10.200	34.67	1.365
1989	Jag 340, Jag Deluxe	28.7	11.300	34.67	1.365
	Super Jag, Jag AFS, Panther, Cougar, Pantera, El Tigre 6000 & EXT, Cheetah Touring, Wildcat 650	25.9	10.200	34.67	1.365
1990	Jag 340	28.7	11.300	34.67	1.365
	Super Jag, Jag AFS, Panther, Cougar, Pantera, El Tigre EXT, Cheetah Touring, Wildcat 650, Prowler	25.9	10.200	34.67	1.365
1991	Jag 340 Mountain Cat	28.7	11.300	34.67	1.365
	Lynx, Jag AFS, Super Jag, Panther, Cougar, Pantera, El Tigre EXT, Prowler, Cheetah Touring, Prowler Special, EXT Special, Wildcat 700	25.9	10.200	34.67	1.365
1992	Lynx, Jag, Panther, Cougar, Pantera, Prowler, Cheetah Touring, Super Jag, EXT, Wildcat EFI	25.9	10.200	34.67	1.365
	Wildcat AWS	28.9	11.375	34.67	1.365
1993	Lynx, Jag, Panther, Cougar, Pantera, Prowler, Cheetah Touring, EXT Models	25.9	10.200	34.67	1.365
	Wildcat AWS Models	28.9	11.375	34.67	1.365
	Thundercat	30.9	12.200	34.67	1.365
1994	Jag, Puma, Panther, Cougar, Pantera, Prowler, Cheetah Models	25.9	10.200	34.67	1.365
	Wildcat EFI Models (AWS)	28.9	11.375	34.67	1.365
	EXT Models, ZR Models, Thundercat Models	30.9	12.200	34.67	1.365
1995	Puma Models, Jag Models, Panther	25.5	10.200	34.67	1.365
	Cougar, Prowler 2-Up, Pantera, All EXT Models, Z440, ZR580, ZR440, Thundercat, ZR700, Wildcat, ZRT 800	30.9	12.200	34.67	1.365
	Bearcat Models	30.9	12.200	34.67	1.367
1996	Puma Models, Jag Models	25.5	10.200	34.67	1.365
	Panther, Cougar, Pantera, All EXT Models, 440, ZR580, ZR440,Thundercat, ZRT600 Wildcat, ZRT800	30.9	12.200	34.67	1.365
	Bearcat Models	30.9	12.200	34.72	1.367
1997	Puma Models, Jag Models, Panther Models, Z440	30.9	12.200	34.67	1.365
	Cougar, Pantera, All EXT Models, ZR440, Thundercat, ZRT600, ZRT800, ZL440	30.9	12.200	34.67	1.365
	Bearcat Models	30.9	12.200	34.72	1.367
	Powder Special, Powder Extreme, Powder EFI	30.9	12.200	34.67	1.365
	ZR580EFI	30.9	12.200	11.53	0.454
1998	Jag Models, Panther Models, Z 440, Cougar Models, Pantera Models, EXT Models, Powder Special Models, Powder Extreme, Thundercat Models, ZRT600, ZRT800, ZR600, ZL440, ZL500, ZR500, ZR440	30.9	12.200	34.67	1.365
	Bearcat Models	30.9	12.200	34.72	1.367
1999	Jag Models, Panther Models, Z Models, Pantera Models, Triple Touring 600, Powder Special Models, Thundercat Models, ZL Models, ZR Models, ZRT Models	30.9	12.200	34.67	1.365
	Bearcat Models	30.9	12.200	34.72	1.367
2000	Bearcat Models	30.9	12.200	34.72	1.367
	All Remaining Models	30.9	12.200	34.67	1.365

Torque Specifications

DRIVE		TORQUE
Drive Clutch	ft-lb kg-m	50-55 6.9-7.6
Spider	ft-lb kg-m	250 34.5
Stationary Shaft Jam Nut	ft-lb kg-m	85 11.8
Drive Clutch Cover	ft-lb kg-m	10 1.4
Driven Pulley Retainer Bracket	ft-lb kg-m	14-16 1.9-2.2
Driven Pulley	ft-lb kg-m	19-24 2.6-3.3
Chain Case Top Sprocket	ft-lb kg-m	35-40 4.8-5.5
Chain Case Bottom Sprocket	ft-lb kg-m	31-33 4.3-4.6
Hub/Brake Disc	in.-lb kg-m	36 0.4
Flange Plates	ft-lb kg-m	16-18 2.2-2.5
Brake Caliper/Chain Case	ft-lb kg-m	30 4.2
Chain Case Cover	ft-lb kg-m	12-15 1.7-2.1
Chain Case Drain Plug	ft-lb kg-m	35 4.8

Troubleshooting Drive Clutch/ Driven Pulley

Problem: Midrange Shift-Up (Too Quickly - Lowers RPM)	
Condition	**Remedy**
1. **Drive clutch spring** weak	1. Replace drive clutch spring
2. **Driven pulley spring** weak	2. Replace driven pulley spring
3. **Driven pulley spring preload tension** inadequate	3. Increase spring preload tension
4. **Center-to-center distance** too close	4. Adjust center-to-center distance
5. **Driven pulley bearing** worn—damaged	5. Replace bearing—movable sheave

Problem: Midrange Shift-Up (Too Slowly - Raises RPM)	
Condition	**Remedy**
1. **Drive clutch components** dirty	1. Clean drive clutch components
2. **Driven pulley components** dirty	2. Clean driven pulley components
3. **Driven pulley spring preload tension** excessive	3. Decrease spring preload tension
4. **Driven pulley bearing** worn—dirty	4. Clean—replace bearing—movable sheave

Problem: Excessive Belt Deposits	
Condition	**Remedy**
1. **Offset** adjusted incorrectly	1. Adjust offset
2. **Drive clutch/driven pulley sheaves** rough—damaged—dirty	2. Repair—replace—clean drive clutch/driven pulley sheaves
3. **Driven pulley movable sheave travel** impaired	3. Service driven pulley
4. **Driven pulley bearing** worn—dirty	4. Clean—replace bearing—movable sheave

Problem: Excessive Belt Drag—Impaired Drive Clutch Disengagement	
Condition	**Remedy**
1. **Drive clutch components** dirty—damaged	1. Clean—replace drive clutch components
2. **Drive belt** does not meet measurement specifications	2. Replace drive belt

Problem: Engine RPM Suddenly Increases—Drive Clutch Vibrates	
Condition	**Remedy**
1. **Cam arm pin** bent—damaged	1. Replace pin
2. **Cam arm** damaged—broken	2. Replace cam arm
3. **Drive clutch** out of balance	3. Align—replace components—drive clutch

Problem: Driven Pulley Vibrates	
Condition	**Remedy**
1. **Sheave rivets** loose—broken	1. Replace sheave
2. **Driven pulley** out of balance	2. Service—replace driven pulley

Problem: Drive Clutch Engagement (Before Specified RPM)	
Condition	**Remedy**
1. **Drive clutch spring** weak—bent	1. Replace spring
2. **Cam arms** incorrect—worn	2. Replace cam arms

Problem: Drive Clutch Engagement (After Specified RPM)	
Condition	**Remedy**
1. **Drive clutch spring** incorrect	1. Replace spring
2. **Spider buttons** worn	2. Replace buttons

Problem: Drive Clutch Sticks	
Condition	**Remedy**
1. **Drive clutch components** dirty	1. Clean drive clutch components
2. **Movable sheave** bent—binding	2. Clean—replace movable sheave
3. **Spider buttons** worn	3. Replace buttons

Problem: Drive Clutch Jerks—Shifts Erratically	
Condition	**Remedy**
1. **Drive clutch** dirty	1. Clean—drive clutch components
2. **Rollers** worn	2. Replace rollers
3. **Cam arms** rough	3. Polish—replace cam arms
4. **Spider buttons** worn	4. Replace buttons
5. **Sheaves** dirty	5. Clean sheaves

Troubleshooting Drive Belt

Problem: Drive Belt Glazed	
Condition	**Remedy**
1. **Drive belt** does not meet measurement specifications	1. Replace drive belt
2. **Drive clutch spring tension** inadequate	2. Replace drive clutch spring
3. **Drive clutch components** dirty—damaged	3. Clean—replace drive clutch
4. **Offset—parallelism—center-to-center distance** adjusted incorrectly	4. Adjust offset—parallelism—center-to-center distance

Problem: Drive Belt Lugs Torn Off—Frayed—Worn in One Spot	
Condition	**Remedy**
1. **Drive belt** does not meet measurement specifications	1. Replace drive belt
2. **Offset—parallelism—center-to-center distance** adjusted incorrectly	2. Adjust offset—parallelism—center-to-center distance
3. **Drive clutch engagement—idle RPM** too high	3. Service drive clutch—reduce idle RPM
4. **Drive clutch components** dirty—damaged	4. Clean—replace drive clutch components
5. **Driven pulley/shaft rotation** impaired	5. Service driven pulley/shaft—chain-case components

Troubleshooting Hydraulic Brake System

Problem: Caliper Leaks	
Condition	**Remedy**
1. **Caliper O-ring** deteriorated — severed	1. Replace O-ring
2. **Piston** — **O-ring** damaged	2. Repair piston — replace piston — O-ring
Problem: Lever Spongy — Bottoms Out	
Condition	**Remedy**
1. **Brake system air bubbles** present	1. Bleed brake system
2. **Master cylinder** damaged — faulty	2. Replace master cylinder
Problem: Oscillation Feedback in Lever	
Condition	**Remedy**
1. **Brake pad residue** present on brake disc	1. Replace pads — clean disc
2. **Caliper** loose	2. Tighten mounting bolts
3. **Brake disc** warped — cracked — damaged — misaligned	3. Replace disc — driven shaft bearing
Problem: Loss of Brake	
Condition	**Remedy**
1. **Brake fluid** overheated — contaminated	1. Replace fluid
2. **Master cylinder** damaged — faulty	2. Replace master cylinder
3. **Caliper** — **brake hose** leaking	3. Replace caliper O-ring — repair piston — replace piston — O-ring — brake hose
4. **Air ducts** obstructed — missing	4. Remove obstruction — replace air ducts
5. **Brake lever linkage** damaged	5. Repair — replace lever — mounting bolt
Problem: Brakes Drag	
Condition	**Remedy**
1. **Master cylinder** damaged — faulty	1. Replace master cylinder
2. **Brake disc** warped — damaged — misaligned	2. Replace disc — driven shaft bearing
3. **Brake pads** worn — tapered	3. Replace pads
Problem: Snowmobile Won't Stop — Have to Pull Too Hard on Lever	
Condition	**Remedy**
1. **Pads/brake disc** glazed	1. Replace pads — clean disc
2. **Brake lever** binding	2. Loosen pivot bolt — replace master cylinder
3. **Caliper pistons** binding	3. Service caliper assembly

SECTION 9 — TRACK/REAR SUSPENSION

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UNDERSTANDING THE SUSPENSION

GENERAL

Quick acceleration and the ability to go through the turns with power are the most important handling qualities. This section explains how the skid frame functions to provide these two important handling qualities. Before proceeding, however, note these terms.

Weight Transfer — A shift in the center of gravity in any direction depends on the force applied.

Track Tension — The amount of tightness or looseness of the track when correctly mounted in the chassis.

Spring Tension — The amount of force exerted on the spring by either fork tension adjustment or eyebolt adjustment.

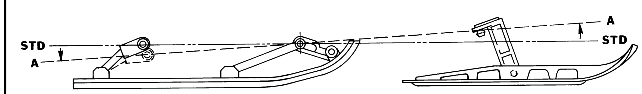
Ski Pressure — The amount of force exerted downward on the skis.

Good weight transfer characteristics are needed for fast acceleration (shift of weight from skis to track) and for cornering (shift of weight back to skis to hold the front end in turns). Effective weight transfer depends on suspension tension, position of rider, and the position of the front arm limiter.

To understand how the suspension system works, think of the entire system in terms of three points; the skid frame rear axle center, the skid frame front arm, and the ski saddle center.

Assume that the front arm functions as a stationary pivot point between the rear axle center and the ski saddle center. Also assume that the ski saddle center is the same height off the ground as the rear axle center. This produces the standard position arrangement.

Fig. 9-1

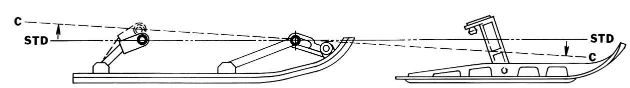


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Under acceleration when the center of gravity is transferred to the rear of the machine, the rear suspension collapses slightly. This brings the rear arm point downward and with the front arm stationary, the teeter-totter effect reduces the pressure on the skis, position A.

However, for controlled cornering, more pressure is needed on the skis. So when the driver decelerates coming into a corner, the center of gravity is transferred forward, putting the required pressure onto the skis and reducing the pressure on the rear suspension, position C.

Fig. 9-2



0728-181

This is essentially what weight transfer is all about — the shift of weight to the rear of the machine for positive traction and good acceleration or to the front of the machine for positive handling and cornering control.

ADJUSTMENT AND HANDLING GUIDE

There are two basic rules to remember when adjusting the drive train to correct handling problems.

1. If encountering handling problems while coming into a corner, correct these problems by working with front end adjustments.
2. If encountering handling problems while coming out of the corner, correct these problems by working with the rear arm shock spring adjustment.

Check to make sure the carbides on the skis and track studs are sharp. Sharp carbides and ice studs are a must for good cornering and handling. Everyone's idea of what sharp really is may differ. What one driver thinks is sharp may actually be too dull for good handling. A good test to see if the carbide has lost its edge is to lightly scrape its edge across your thumb nail. If it is sharp, a fine powder will be removed from your nail. If this doesn't happen, it has lost its edge and must be sharpened. To sharpen the carbide, some type of fixture will be needed to hold the carbide at the correct angle to an electric grinding wheel.

A file and whetstone could be used, but that would take a long time and a lot of hard work to get the sharpness required. Carbide should be sharpened quite often. For this reason, an extra set ready to change in a hurry is a necessity.

To assist in correcting different handling problems, review the following Adjustment Handling Guide section for the handling problem in the left column and its most probable corrective adjustment in the right column.

PROBLEM	REMEDY
1. Machine darts	1. Hard pack or deep snow A. Loosen front arm spring tension 2. Sticky snow conditions A. Tighten front arm spring tension 3. Check ski alignment, must be toed out 1/8" at front 4. Check slide rail. If worn, replace 5. Check steering rods for being worn or loose
2. Rear of machine acts like it wants to come around and pass the front	1. Loosen front arm spring tension 2. Soften rear spring tension 3. Add some studs to center belt of track 4. Move rear arm forward to next hole in rails 5. Decrease front spring rate or install softer springs
3. Machine doesn't go around turns or corners without drifting	1. Stiffen front springs 2. Adjust rear spring blocks tighter 3. Install carbide wear bars
4. Machine rear starts to come around leaving corner	1. Decrease rear spring rate evenly on both sides
5. Heavy steering	1. Grease front spindles. Make sure grease comes out both top and bottom of spindle 2. Loosen bellcrank bolts 1/2 turn, lube pivot area with WD40 3. Move rear arm forward to next mounting hole. On 1989 models, drill another hole 1-1/2" forward of original mounting location. 4. Loosen rear spring tension or install softer springs
6. Slow in powder snow	1. Loosen front arm, front arm is adjusted too tight 2. Soften rear suspension
7. Stiff ride	1. Move rear arm forward to next mounting hole 2. Adjust rear spring tension

9

Problems Entering Corner	Remedy
1. Front end pushes coming into corner	1. Check carbide sharpness 2. Check front arm adjustment 3. Shorten right side sway bar linkage 4. Increase front shock spring tension only on right ski 5. Increase left rear spring tension
2. Rear of machine starts to come around or drift entering corner	1. Lengthen right side sway bar linkage 2. Decrease front spring rate or ski pressure 3. Check track studs for sharpness
3. Left ski lifts	1. Lengthen right side sway bar linkage 2. Increase right rear spring tension as needed or decrease left rear spring tension
Problems Going Around or Leaving Corner	**Remedy**
1. Front end pushes coming out of corner	1. Tighten front arm stop 2. Increase rear spring tension on both shocks if machine is flat. Increase left rear spring tension 3. Increase left rear spring tension
2. Left ski lifts	1. Check machine roll angle. Shorten left sway bar linkage 2. Increase right rear spring tension as needed or decrease left rear spring tension 3. Increase both right and left spring tension on rear shocks
3. Rear of machine starts to come around leaving corner	1. Decrease rear spring tension evenly on both shocks
General Handling Problems	**Remedy**
1. Machine darts from side to side or the front end collapses	1. Check ski alignment 2. Check ski bump steer 3. Check steering rods for being worn or loose

SUSPENSION SETUP BASICS

FRONT ARM SPRING TENSION

■ NOTE: Read the following information closely as it pertains to all suspensions used in the last several years. If there are any questions, please contact the Arctic Cat Service Department.

It is desirable to run with very light front arm spring tension. When riding in 4 in. or more of snow, the machine will be quicker if the front spring tension is adjusted lightly.

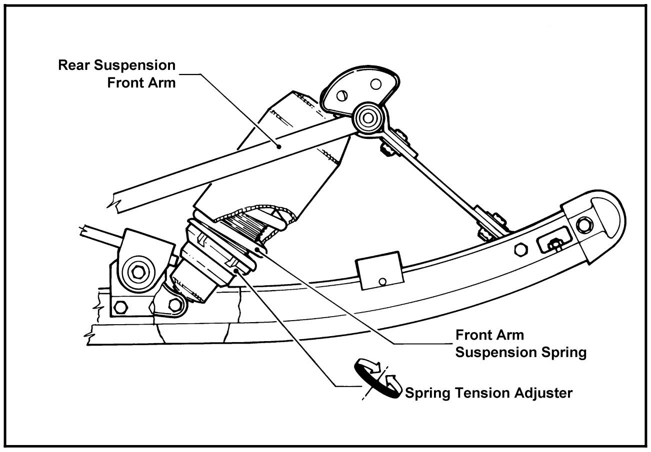
If the spring tension is adjusted too stiff, the track angle at the front of the skid frame is steep. This steep angle prevents the snowmobile from getting up on plane and slows down by 5 to 8 mph.

When riding in sticky snow (springtime or warm days) or hill climbing on hard snow, it may be desirable to stiffen the front arm spring tension. When this is done, weight is transferred back quicker. The problem with too much front arm spring tension is that the feel of the snowmobile becomes very short. The reason for this is the front arm becomes the pivot point between the spindles and rear of the machine. With dominant spring tension on the front arm, the suspension is basically contacting the snow from a point below the front arm to the skis or the spindle pressure point. This makes for a very short and darting machine on the trail. This is especially true when decelerating and the center of gravity is transferred forward.

A good method for adjusting the front spring tension follows.

■ NOTE: On those models having a coil spring over the front arm shock absorber, the spring tension should be set as soft as possible when operating on trails and in deep snow.

Fig. 9-3



FRONT ARM LIMITER STRAPS

Under no circumstances should the front arm limiter strap be lengthened. If lengthened, it may cause shock absorber travel problems.

The two limiter straps on AWS models can be shortened if desired. This adjustment must be made to suit driving style and some test driving time. With the rear arm in its present mounting location, no advantage has been noted from changing the strap length. If the front arm straps are shortened, the result will be more ski pressure and aggressive steering.

SKI SHOCK ABSORBER SPRINGS

The shock absorber springs have been matched to the shock valving and rear suspension. These springs are the result of hours of testing and comparison riding trying many different combinations of springs and shocks. If there is a need to make changes, there are several spring and shock sizes to choose from. While making these changes, keep the following points in mind.

Heavier Or Stiffer Springs

1. These will require shocks with more rebound control, or the front end will become like a pogo stick.
2. With stiffer springs, the front end will become more aggressive in the corners as more weight will be transferred to the skis when decelerating. Also, more weight is transferred to the rear on acceleration and can cause the rear shocks and spring to bottom out.
3. If the springs are too stiff for general riding conditions and style, the ride comfort is gone.

Spring Tension Too Soft

1. Front end bottoms out; hard on front end parts.
2. Less aggressive steering in corners on deceleration, and less weight is transferred to the skis because of softer springs.
3. Less weight gets transferred to rear of the machine upon acceleration.

■ NOTE: When softening the ski springs, also soften the rear to match entire suspension.

⚠ CAUTION

If the ski shock spring is adjusted too loose, the spring retainer may fall out. If the spring is adjusted beyond specification, the spring will coil bind and spring adjuster damage will occur.

FRONT ARM SPRING TENSION TOO STIFF

1. Slows machine down in loose snow.
2. Causes the machine to dart and dive as a result of less track on the ground on deceleration.

■ **NOTE: It has been our experience that a tight front arm works well under only two conditions: sticky snow conditions in the spring of the year and in hill climbing on hard packed snow.**

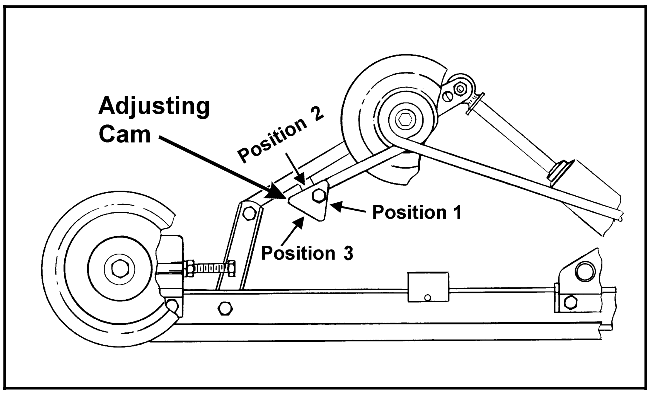
It has also been our experience with AFS models that with the front arm adjusted too soft, the spring may come off the roller. There haven't been any other problems in handling caused by a soft front arm.

REAR ARM SPRING TENSION

The rear spring tension is adjusted for the weight of the driver. There are three possible adjustments.

1st block position - set for up to 150 lb
2nd block position - set for 150 to 200 lb
3rd block position - set for over 200 lb

Fig. 9-4



727-720A

REAR ARM MOUNTING POSITION (Between Rails)

For 2000, there are several mounting holes found in the rails for installing the rear arm.

The holes have been added to the suspension to provide adjustment to fine-tune the suspension to driving styles.

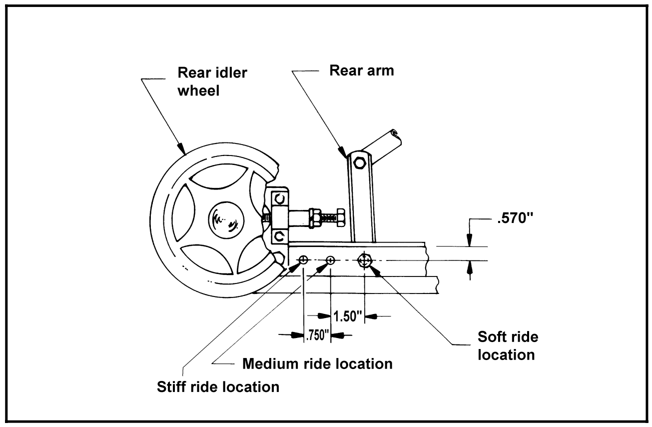
If the ride is too soft, moving the rear arm back between the rails will stiffen the ride. By moving the rear arm forward, it will collapse quicker and allow more transfer of weight to the back of the suspension. This will also affect the handling by providing a softer ride and also easier steering.

■ **NOTE: Please add the third hole to any FasTrack suspension on 1994 through 1997 models. It can easily be done by drilling a 3/8 in. hole 3/4 in. behind the last hole in the rails.**

⚠ CAUTION

The rear arm mounting position between the rails on all 1998 Panther models must remain in the rear mounting hole. If the arm is moved forward, rear arm and rear shock damage will occur.

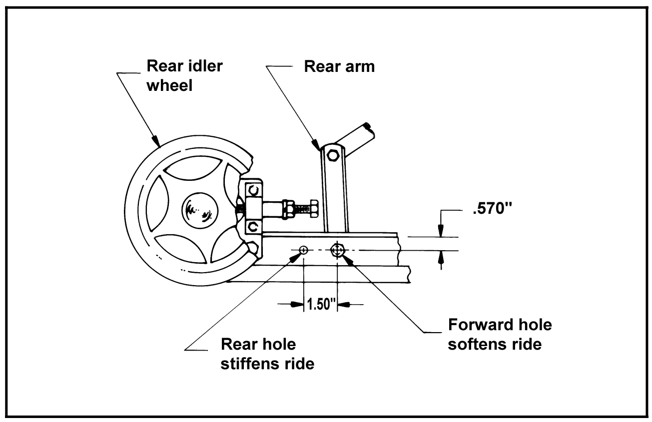
Fig. 9-5



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The drawbacks of moving the rear arm forward are that the suspension may bottom out quicker and some travel is lost.

Fig. 9-6



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■ **NOTE: When making any changes to the front or rear suspension, the change should be made at both ends to keep the suspension balanced. For example, installing stiffer springs in front may require installing the next step stiffer spring in back to keep everything in balance.**

In an effort to assist everyone with suspension adjustment, use the Adjustment and Handling Guide on page 9-3. If there are any questions, please contact the Service Department.

WISH BONE ARM SUSPENSION (All Models with Rubber Mounting Bushings)

Proper setup on the AWS style front-end assembly with rubber mounting bushings starts by making sure the wishbone arms are parallel. To check, follow the procedure below.

1. Lift the front-end assembly high enough so the skis are off the floor. Place a support under the belly pan.
2. Remove both shock absorbers.
3. Standing in front of the machine, view the wishbone arms to see if they are parallel with the chassis. If they are not level, proceed to step 4.
4. Lift each ski assembly separately until it is level or parallel, then place a support (block of wood) under the ski to hold arms parallel.
5. Remove the exhaust pipe.
6. Loosen the four bolts securing the upper and lower wishbone arms to the front end assembly.

Fig. 9-7

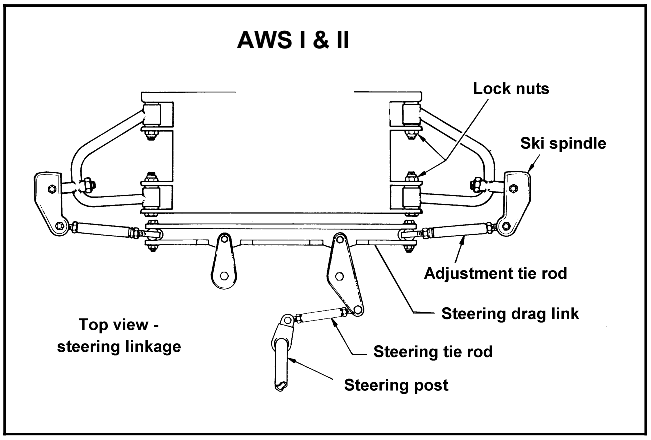
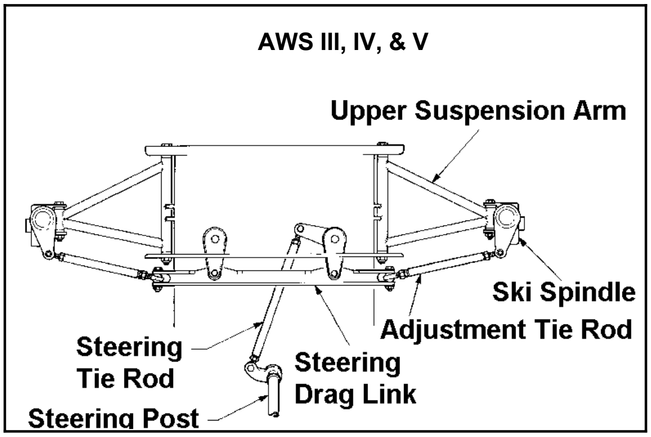


Fig. 9-8



7. Lift each ski assembly to maximum travel and set back down on support. Standing in front, check once again to make sure arms are parallel.
8. Tighten the four bolts securing the two arms on each side to 9.7 kg-m (70 ft-lb).
9. Install the shock absorber making sure to tighten the two mounting bolts.

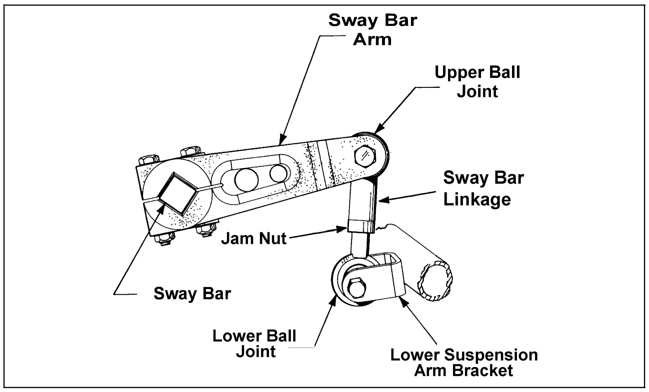
■ **NOTE: The above procedure is not required on AWS front-end assemblies having solid bushings in the A-Arms. The bolts should be checked for proper torque on these models.**

10. Install the exhaust pipe.

■ **NOTE: It is important that the ski tips are slightly elevated. Preloading the skis in the slightly upward position enhances the handling characteristics of the snowmobile.**

ADJUSTING SWAY BAR LINKAGE

Fig. 9-9



1. Place a lift or stand under snowmobile so the skis are off the ground and the ski shocks are fully extended.
2. On the right side, remove the cap screw connecting the lower ball joint on sway bar linkage.

■ **NOTE: If the sway bar is in proper adjustment, holes in the suspension bracket and the ball joint will line up. If they do not line up, the linkage will need to be adjusted.**

3. If the ball joint is lower than the bracket, loosen the jam nut and shorten the linkage. If the linkage will not adjust short enough, go to left side and lengthen linkage until ball joint and bracket holes are lined up.
4. If the ball joint is above the bracket, shorten the left side linkage to get alignment. If linkage will not go short enough, lengthen the right side linkage to get the alignment.

■ **NOTE: Adjust the linkages so they stay as short as possible.**

5. Install the ball joint into suspension bracket and secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

6. Reset the jam nuts while making sure the ball joints are centered in the sway bar and suspension brackets.

■ **NOTE: If one linkage becomes extra long, the sway bar should be removed and inspected for damage or twisting.**

SKI ALIGNMENT — AWS MODELS

■ **NOTE: Before starting the ski alignment procedure, be sure the track has been properly tightened and aligned.**

1. Turn the handlebar to the straight-ahead position.
2. Place a long straightedge against the outside edge of the track so it lies along the inside edge of the left-side ski.

■ **NOTE: The straightedge should be long enough to extend from the back of the track to the front of the ski.**

3. Measure the distance from the straightedge to the edge of the ski in two places. Take one measurement from the forward end of the ski edge and the other measurement from the rearward end of the ski edge.

■ **NOTE: Make sure the measurements are taken on the flat surface of the ski edge and not on the rounded surface.**

4. The measurement from the forward and rearward ends of the ski edge either must be equal or the forward measurement must not exceed the rearward measurement by more than 3 mm (1/8 in.).

■ **NOTE: On those skis not having carbide wear bars, it is better to have the skis "toed out" 1/8 - 1/4 in. for best handling. If the ski tips are "toed in," the machine will dart when trail riding.**

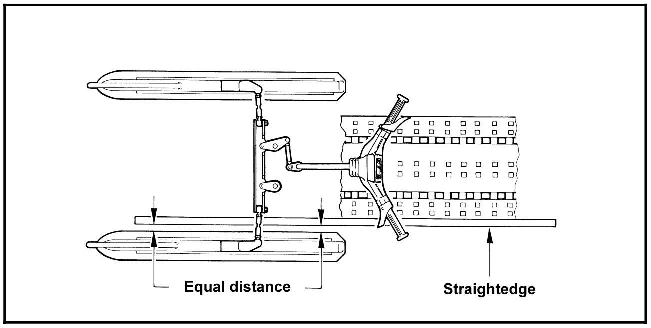
5. If an adjustment is necessary, loosen the tie rod jam nuts. Adjust ski alignment by rotating the tie rod.
6. After making necessary adjustments, apply red Loctite #271 to the threads of the tie rod and tighten the jam nuts against the tie rod.

⚠ WARNING

Neglecting to use Loctite and tightening the jam nuts may cause loss of snowmobile control and possible personal injury or death.

7. Repeat procedure for the right-side ski.

Fig. 9-10



0730-129

SUSPENSION TYPE & MOUNTING LOCATION CHART

The following information will provide the type of suspension used in each 2000 model and its mounting location.

To clarify the mounting location columns, use the chart and illustrations found on the following pages.

1999-2000 SUSPENSION MOUNTING LOCATION CHART

■ **NOTE: The Rear Arm Mounting Position refers to where the rear arm mounts into the tunnel. The Rear Arm To Rail Position refers to where the lower portion of the rear arm mounts between the slide rails.**

MODEL	TRACK LENGTH & LUG HEIGHT	SKID FRAME	FRONT ARM MOUNTING POSITION	REAR ARM MOUNTING POSITION	REAR ARM TO RAIL POSITION	SHOCK LINK ROD P/N	SHOCK LINK ROD LENGTH
Z 370	15" x 121" x .750"	Fastrack—Formed Rail	Upper	Above Running Board	Middle	0704-350	11.750 in. (298.45 mm)
Panther 340 — Panther 440	15" x 136" x .750"	Fastrack—Formed Rail with Torque Link	Upper	Above Running Board*	Rear	0704-324	12.600 in. (320.04 mm)
Panther 550	15" x 136" x .750"	Fastrack—Stamped Rail with Torque Link	Upper	Above Running Board**	Rear	0704-324	12.600 in. (320.04 mm)
Z 440 — ZL 440	15" x 121" x .750"	Fastrack—Stamped Rail with Torque Link	Upper	Above Running Board	Second Hole Back	0704-350	11.750 in. (298.45 mm)
ZL 500/500 EFI/550/580 EFI/ 600/600 EFI/700	15" x 121" x .850"	Fastrack—Stamped Rail with Torque Link	Upper	Above Running Board	Second Hole Back	0704-350	11.750 in. (298.45 mm)
Pantera 580 EFI — Pantera 1000 — Triple Touring 600	15" x 136" x .750"	Fastrack—Stamped Rail with Torque Link	Upper	Above Running Board	No Adjustment	0704-334	13.500 in. (342.90 mm)
ZRT 600 — ZRT 800	15" x 121" x .850"	Fastrack—Stamped Rail with Torque Link	Upper	Above Running Board	Second Hole Back	0704-350	11.750 in. (298.45 mm)
ZR 500 Models — ZR 600 Models (Carb) — ZR 700/700 LE	15" x 121" x .850"	Fastrack—Stamped Rail with Torque Link	Upper	Above Running Board	Second Hole Back	0704-350	11.750 in. (298.45 mm)
ZR 600 EFI	15" x 121" x .850"	Fastrack—Stamped Rail with Torque Link	Upper	Above Running Board	Second Hole Back	0704-350	11.750 in. (298.45 mm)
ZR 600 EFI LE	15" x 121" x .850"	Fastrack—Stamped Rail with Torque Link	Upper	Above Running Board	Second Hole Back	0704-361	11.050 in. (280.67 mm)
Thundercat	15" x 121" x .850"	Fastrack—Stamped Rail with Torque Link	Upper	Above Running Board	Second Hole Back	0704-350	11.750 in. (298.45 mm)
Thundercat M/C	15" x 136" x 2.00"	Fastrack—Stamped Rail with Torque Link	Upper	Below Running Board	Second Hole Back	0704-350	11.750 in. (298.45 mm)

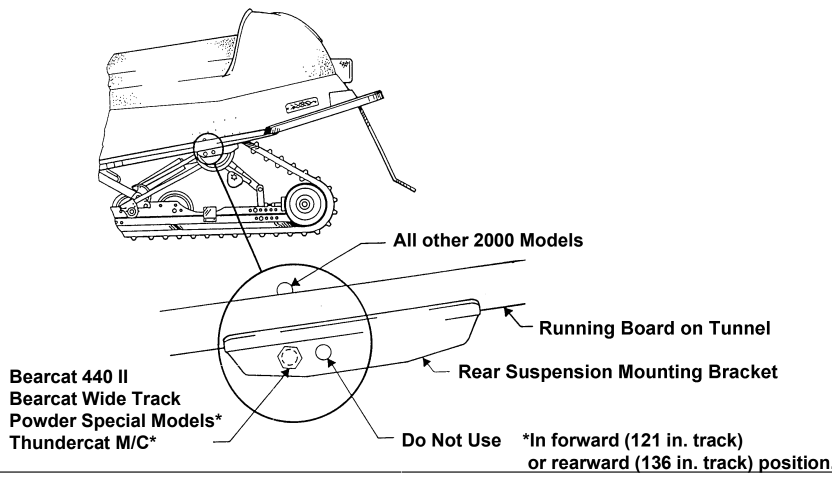
* In Forward mounting hole
** In Rear mounting hole

MODEL	TRACK LENGTH & LUG HEIGHT	SKID FRAME	FRONT ARM MOUNTING POSITION	REAR ARM MOUNTING POSITION	REAR ARM TO RAIL POSITION	SHOCK LINK ROD P/N	SHOCK LINK ROD LENGTH
Powder Special 500 EFI Powder Special 500 EFI LE	15" x 136" x 1.40	Fastrack—Stamped Rail with Torque Link	Upper	Below Running Board	Forward Hole	0704-334	13.500 in. (342.90 mm)
Powder Special 600 — Powder Special 600 EFI	15" x 136" x 2.00"	Fastrack—Stamped Rail with Torque Link	Upper	Below Running Board	Forward Hole	0704-334	13.500 in. (342.90 mm)
Powder Special 700 — Powder Special 700 LE	15" x 136" x 2.00"	Fastrack—Stamped Rail with Torque Link	Lower	Below Running Board	Forward Hole	0704-334	13.500 in. (342.90 mm)
Powder Special 600 EFI LE	15" x 136" x 2.00"	Fastrack—Stamped Rail with Torque Link	Upper	Below Running board	Forward Hole	0704-350	11.750 in. (298.45 mm)
Bearcat 340	15" x 136" x .750"	Fastrack—Formed Rail	Upper	Above Running Board	Middle	0704-125	11.750 in. (298.45 mm)
Bearcat 440 I Bearcat 440 II	15" x 136" x .920" 16" x 156" x 1.00"	Fastrack—Formed Rail — Articulating**	Lower	136" Above 156" Below Running Board*	Middle	0704-125	11.750 in. (298.45 mm)
Bearcat Wide Track	20" x 156" x 1.00"	Fastrack—Formed Rail — Articulating	Lower	Below Running Board*	Middle	0704-125	11.750 in. (298.45 mm)

* In Forward mounting hole
** 440 II only

REAR SKID FRAME MOUNTING HOLES

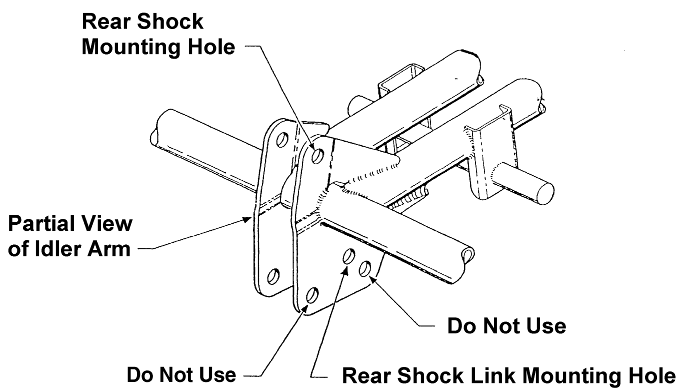
Fig. 9-11



0733-195

REAR SHOCK LINK AND REAR SHOCK MOUNTING LOCATIONS

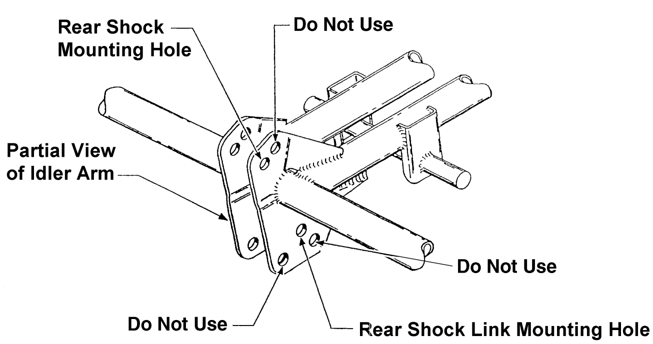
Fig. 9-12



Powder Special 500 EFI/500 EFI LE		ZR 500 EFI
Powder Special 600 EFI/600 EFI LE		ZR 600
Powder Special 700/700 LE	ZR 600 EFI/600 EFI LE	
Thundercat	ZR 700/700 LE	
Thundercat M/C	ZRT 600	
ZR 500	ZRT 800	

733-190A

Fig. 9-13



		ZL 550
Panther 340	Triple Touring 600	ZL 580 EFI
Panther 440	Z 370	ZL 600
Panther 550	Z 440	ZL 700
Pantera 580 EFI	ZL 440	ZL 500 EFI
Pantera 1000	ZL 500	ZL 600 EFI

733-190C

9

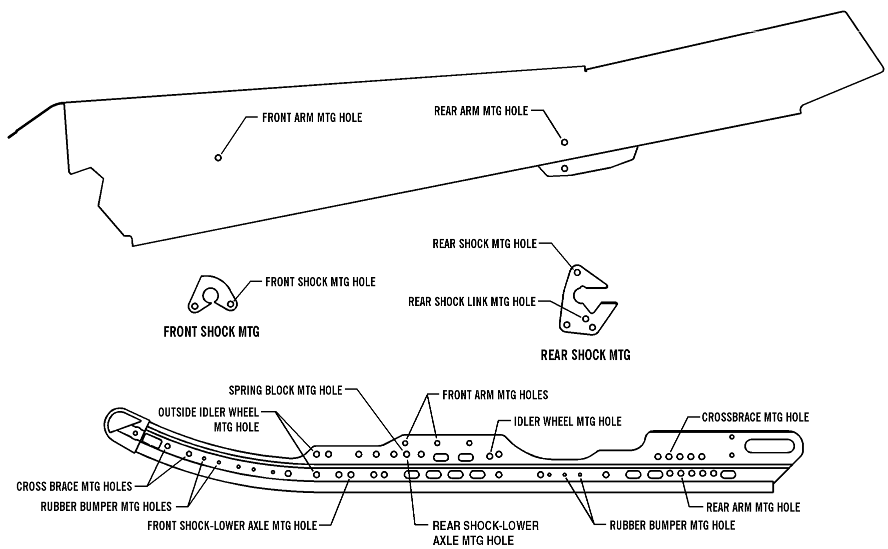
CHASSIS AND SKID FRAME MOUNTING LOCATIONS

The suspensions have several possible mounting locations in the slide rails and tunnel. However, it is recommended by Arctic Cat Inc. that when disassembling and assembling the suspension, all stock mounting locations be used as shown in the following illustrations.

> ⚠ **CAUTION**
>
> **It is extremely important that all stock mounting locations be used. If any alterations to the skid frame are made, shock absorber and suspension damage may occur.**

Fig. 9-14

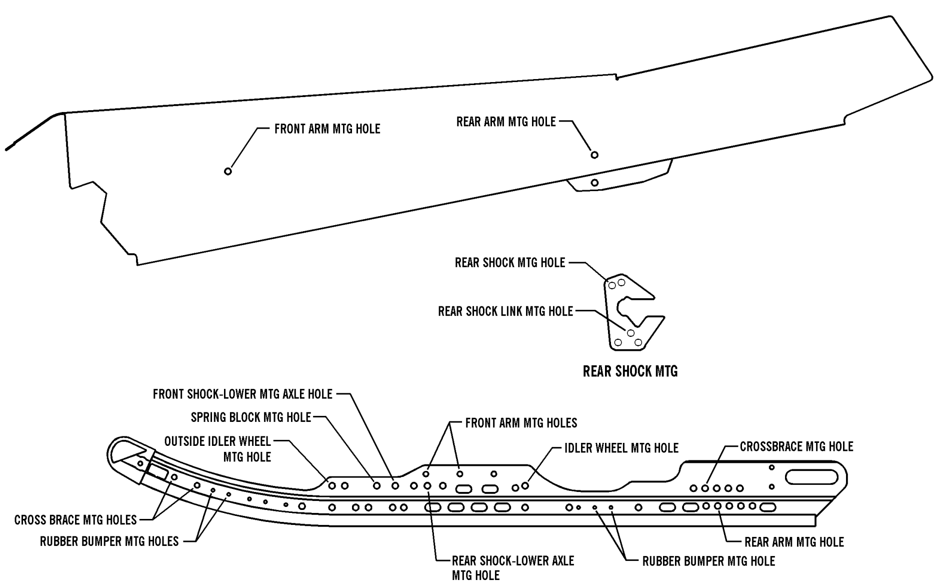
Thundercat — ZR 500/500 EFI/500 EFI LE — ZR 600/600 EFI/600 EFI LE — ZR 700/700 LE — ZRT Models



0735-281

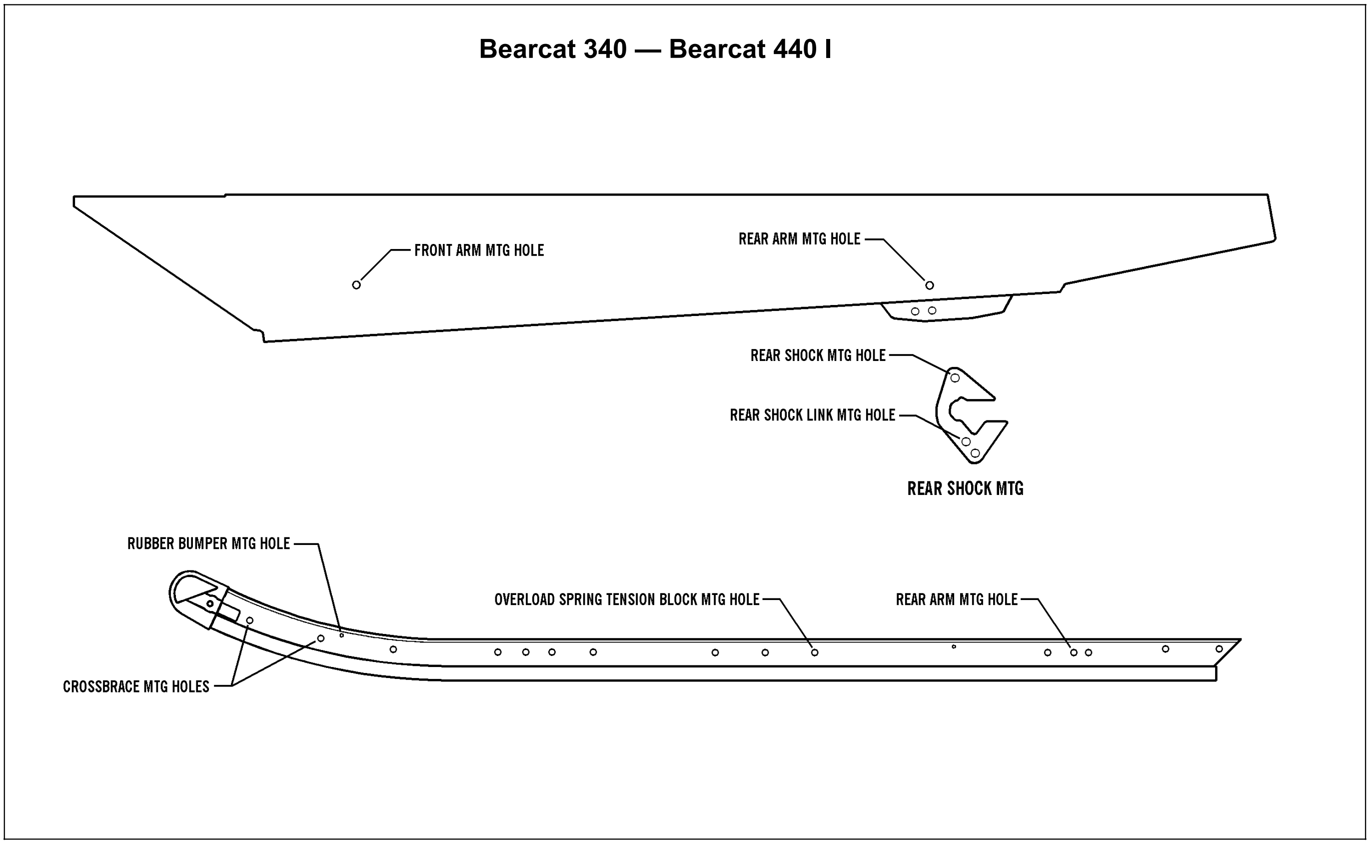
Fig. 9-15

ZL Models



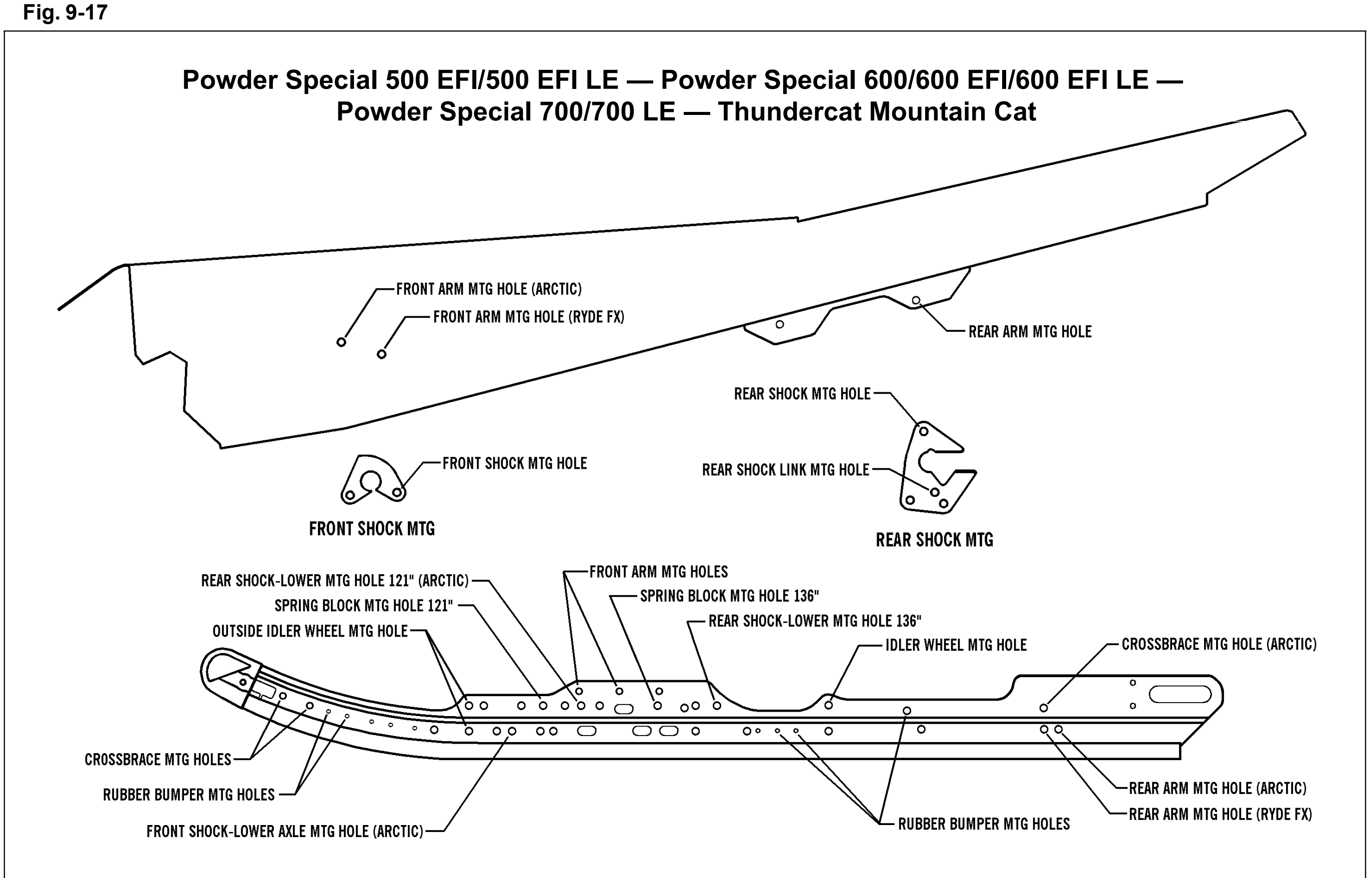
0735-284

Fig. 9-16



0735-310

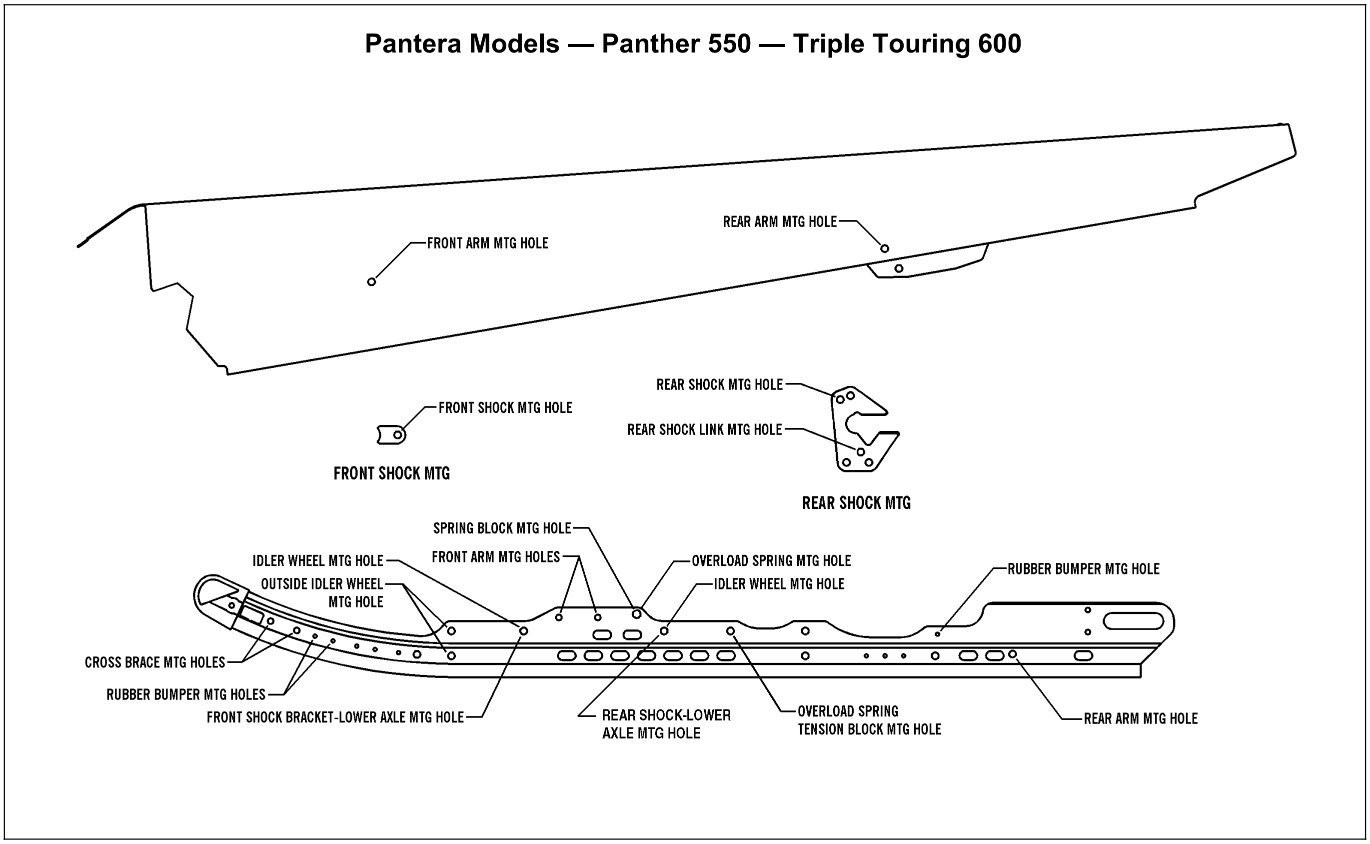
Fig. 9-17



0735-282

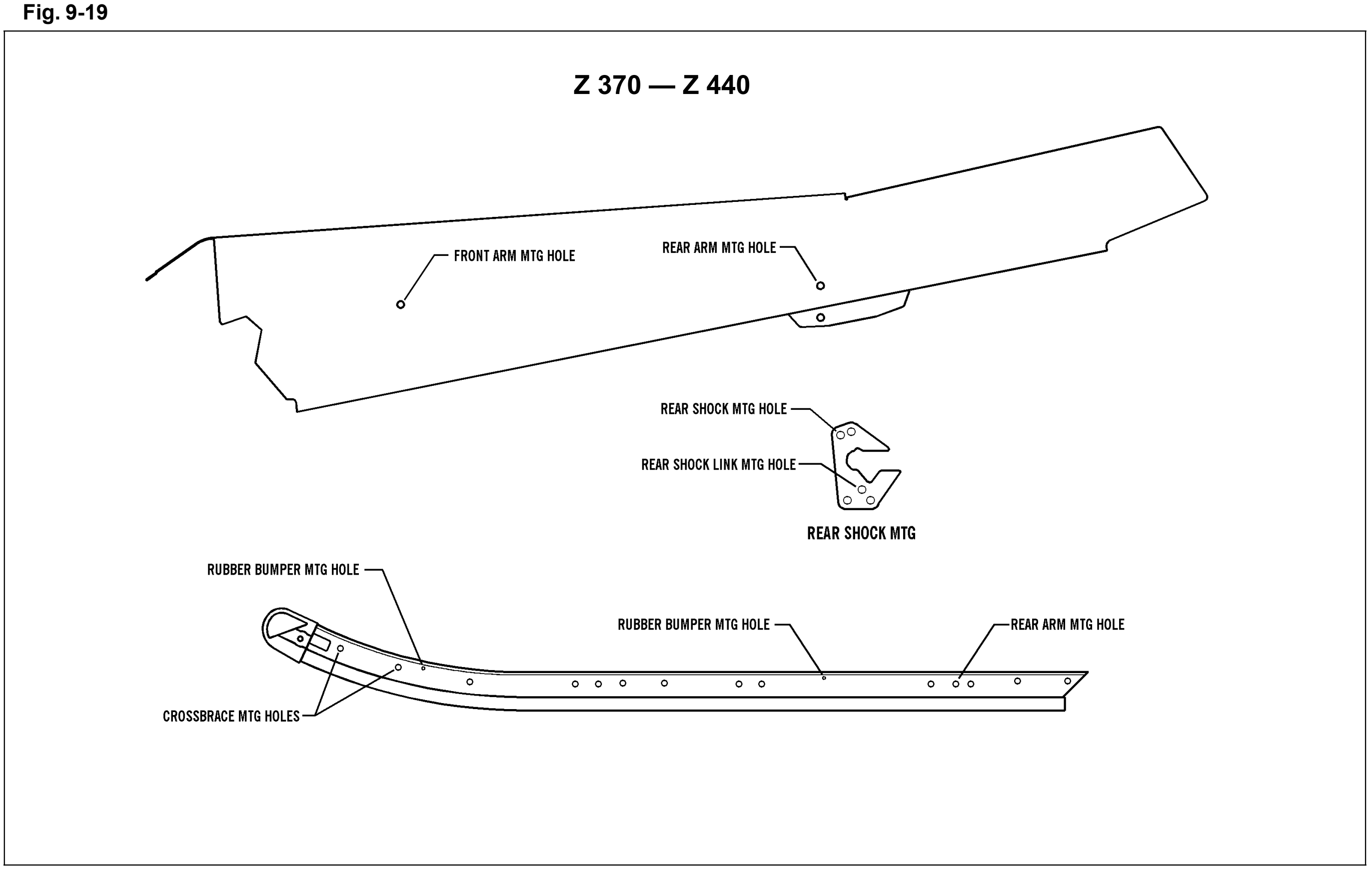
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Fig. 9-18



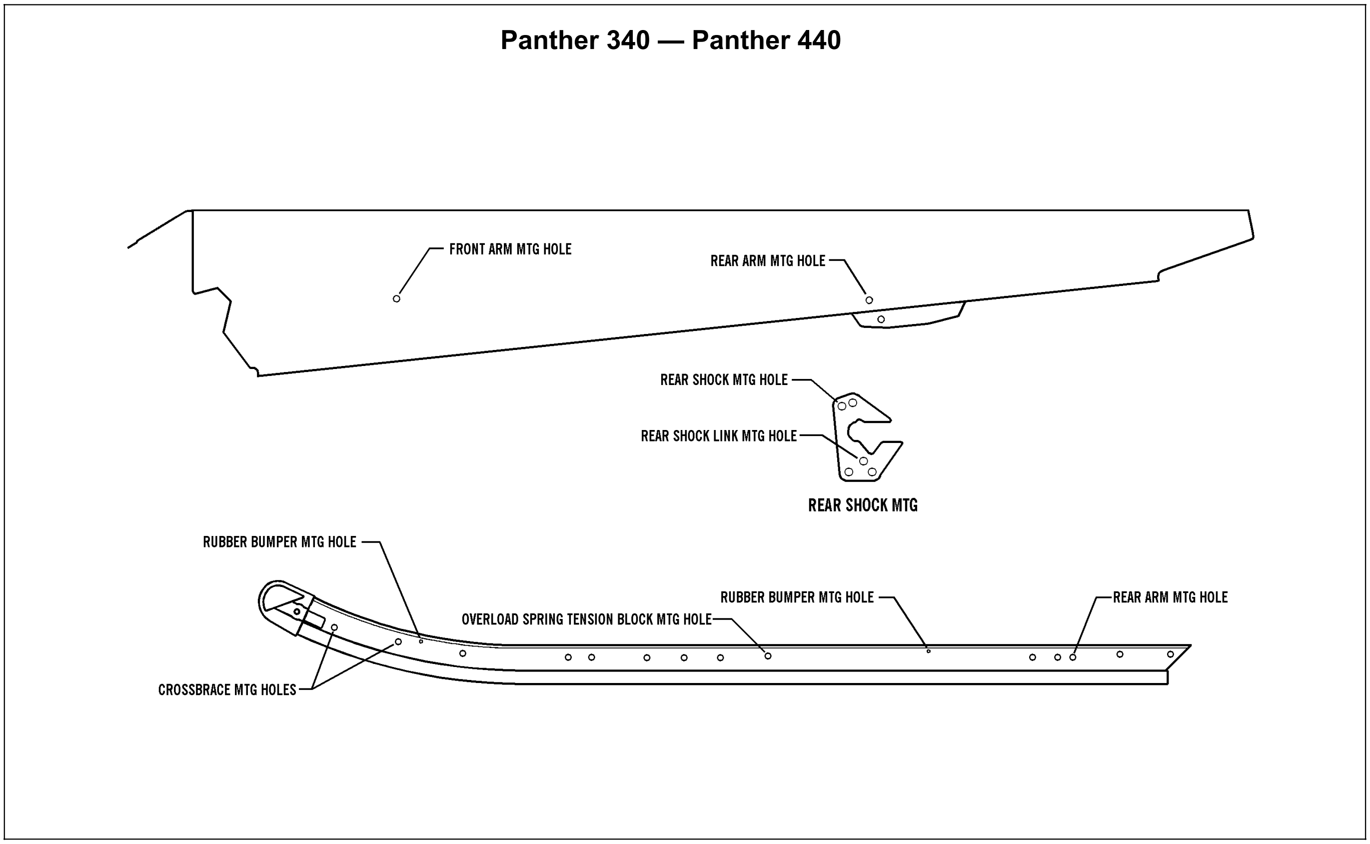
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Fig. 9-19



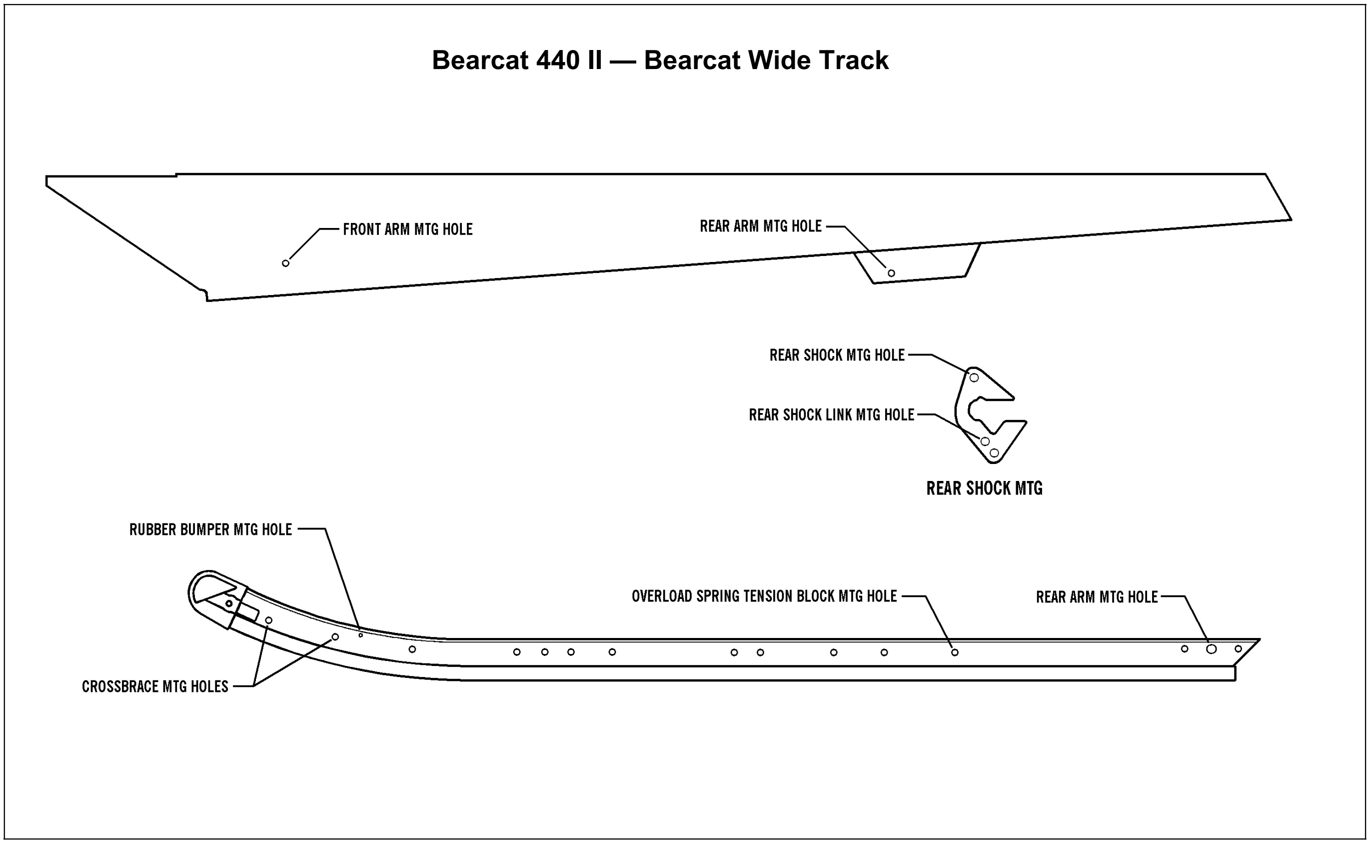
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Fig. 9-20



0735-289

Fig. 9-21



0735-309

9

Servicing Chart

This chart is designed to direct the technician to the appropriate Skid Frame Schematics and Repair Procedure for servicing the rear suspension. Select the snowmobile model from the list and follow the chart to attain schematic designation and repair procedure.

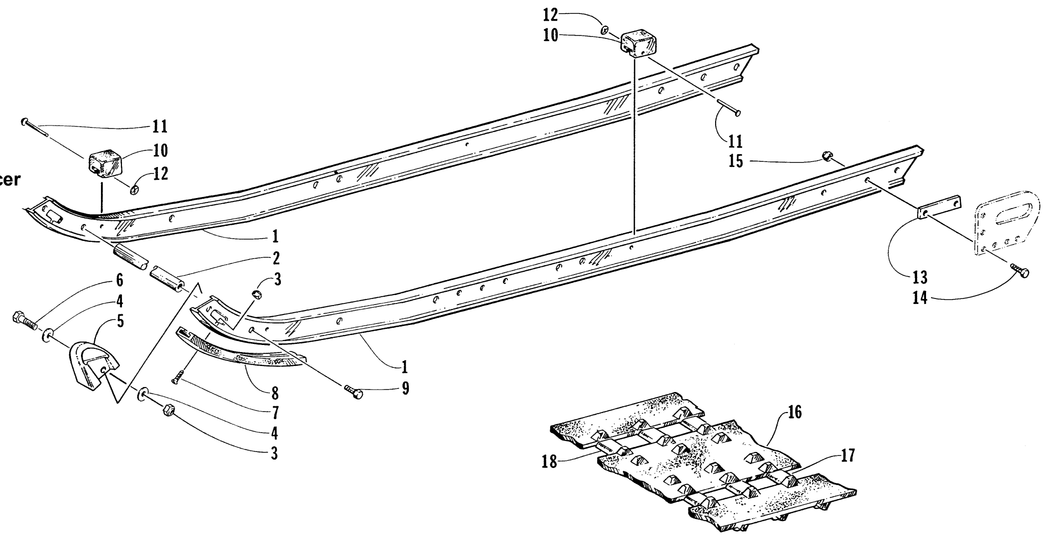
Snowmobile Models	Slide Rail Style	Front Arm Style	Rear Arm Style	Idler Wheels Style	Articulating Skid Frame Style	Repair Procedure
Bearcat 340	A	B	H	B	N/A	3
Bearcat 440 I	A	B	H	B	N/A	3
Bearcat 440 II	A	C	C	C	A	3
Bearcat W/T	A	C	D	D	B	3
Pantera 580 EFI	G	E	B	G	N/A	2
Pantera 1000	G	E	B	G	N/A	2
Panther 340	A	D	B	E	N/A	3
Panther 440	A	D	B	E	N/A	3
Panther 550	G	E	B	F	N/A	2
Powder Special 500 EFI	D	E	G	J	N/A	2
Powder Special 500 EFI LE	E	F	F	K	N/A	1
Powder Special 600	E	E	G	J	N/A	2
Powder Special 600 LE	E	F	F	K	N/A	1
Powder Special 600 EFI	E	E	G	J	N/A	2
Powder Special 600 EFI LE	E	F	F	K	N/A	1
Powder Special 700	E	F	F	K	N/A	1
Powder Special 700 LE	E	F	F	K	N/A	1
Thundercat	F	F	F	M	N/A	1
Thundercat M/C	E	F	F	K	N/A	1
Triple Touring 600	G	E	B	L	N/A	2
Z 370	A	A	A	A	N/A	3
Z 440	A	A	A	A	N/A	3
ZL 440	B	E	E	H	N/A	2
ZL 500	B	E	E	H	N/A	2
ZL 500 EFI	B	E	E	H	N/A	2
ZL 550	B	E	E	H	N/A	2
ZL 580 EFI	B	E	E	H	N/A	2
ZL 600	B	E	E	H	N/A	2
ZL 600 EFI	B	E	E	H	N/A	2
ZL 700	B	E	E	H	N/A	1
ZR 500	F	F	F	I	N/A	1
ZR 500 EFI	F	F	F	I	N/A	1
ZR 600	F	F	F	I	N/A	1
ZR 600 EFI	F	F	F	I	N/A	1
ZR 600 EFI LE (Clicker)	C	H	F	I	N/A	1
ZR 600 EFI LE (Reverse)	F	F	F	I	N/A	1
ZR 700	F	F	F	I	N/A	1
ZR 700 LE (Clicker)	C	G	F	I	N/A	1
ZR 700 LE (Reverse)	F	F	F	I	N/A	1
ZRT 600	F	F	F	M	N/A	1
ZRT 800	F	F	F	M	N/A	1

Slide Rail Schematics

Fig. 9-22

KEY
1. Formed Rail
2. Crossbrace
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Machine Screw
8. Wear Strip
9. Cap Screw
10. Shock Pad
11. Solid Rivet
12. Push Nut
13. Rear Axle Housing Spacer
14. Cap Screw
15. Lock Nut
16. Track Assy
17. Guide Clip
18. Wear Clip

Style A

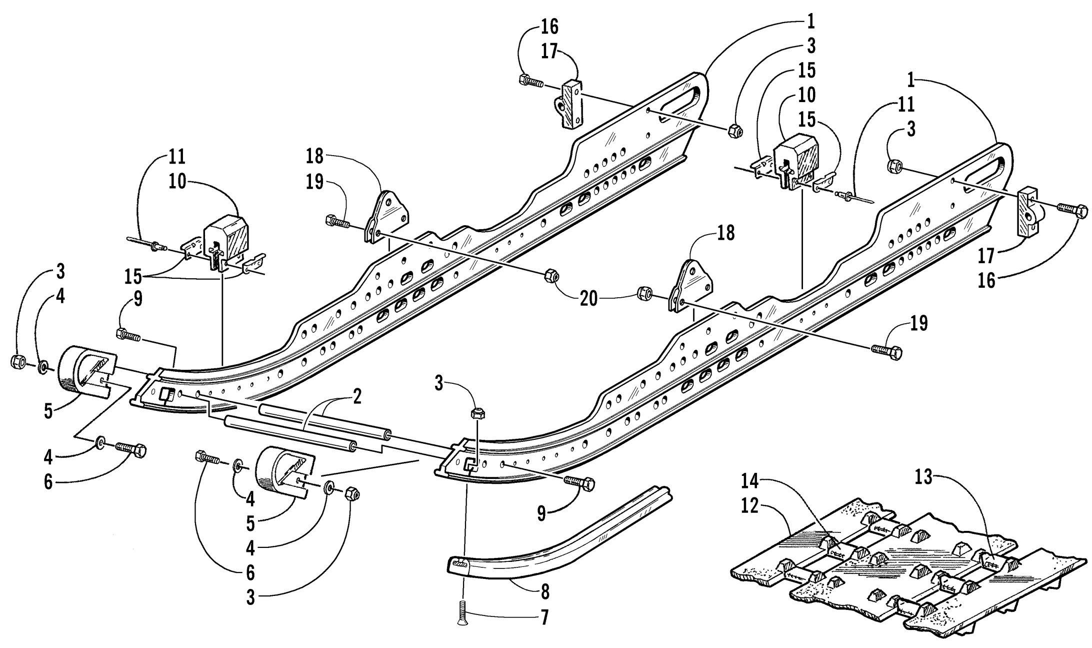


0730-954

Fig. 9-23

KEY
1. Formed Rail
2. Crossbrace
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Machine Screw
8. Wear Strip
9. Cap Screw
10. Shock Pad
11. Rivet
12. Track Assy
13. Guide Clip
14. Wear Clip
15. Bracket
16. Cap Screw
17. Track Adjuster
18. Mounting Bracket
19. Cap Screw
20. Lock Nut

Style B

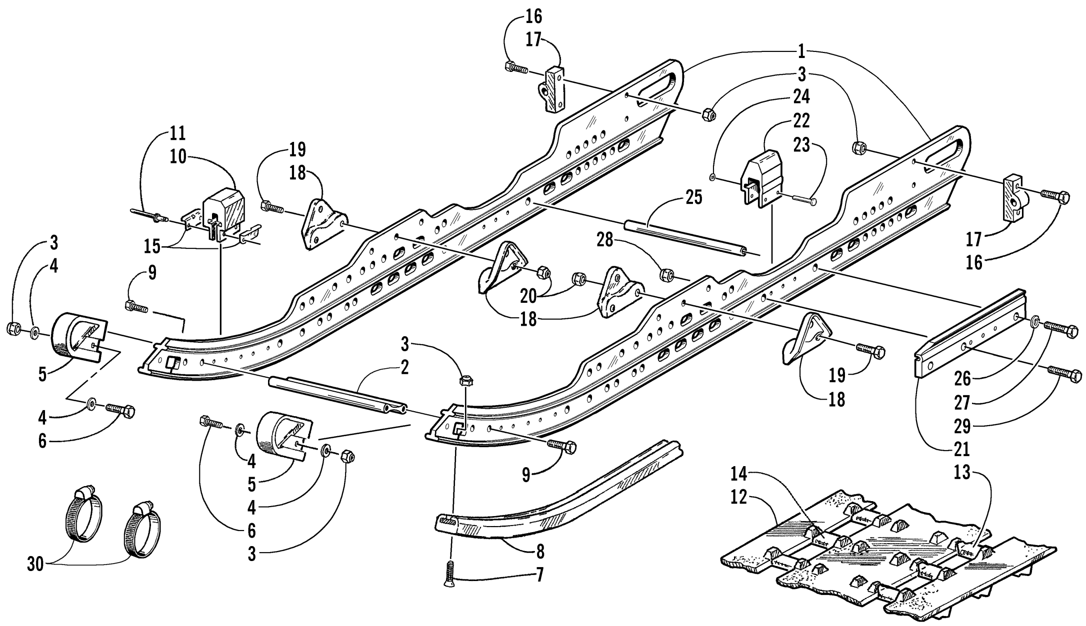


0735-060

Fig. 9-24

Style C

KEY
1. Formed Rail
2. Crossbrace
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Machine Screw
8. Wear Strip
9. Cap Screw
10. Pad
11. Rivet
12. Track Assy
13. Guide Clip
14. Wear Clip
15. Retaining Bracket
16. Cap Screw
17. Adjuster
18. Mounting Bracket
19. Cap Screw
20. Lock Nut
21. Brace
22. Pad
23. Rivet
24. Push Nut
25. Axle
26. Lock Washer
27. Cap Screw
28. Lock Nut
29. Cap Screw
30. Reservoir Clamp

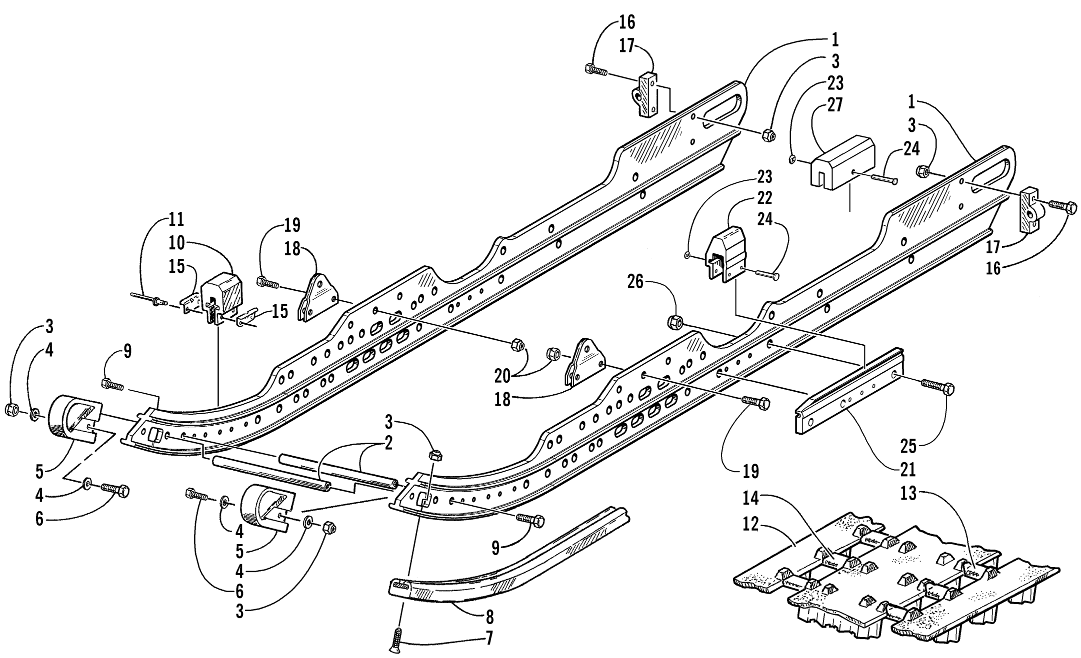


0735-257

Fig. 9-25

Style D

KEY
1. Formed Rail
2. Crossbrace
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Machine Screw
8. Wear Strip
9. Cap Screw
10. Shock Pad
11. Rivet
12. Track Assy
13. Guide Clip
14. Wear Clip
15. Retaining Bracket
16. Cap Screw
17. Track Adjuster
18. Mounting Bracket
19. Cap Screw
20. Nut
21. Brace
22. Shock Pad
23. Push Nut
24. Rivet
25. Cap Screw
26. Lock Nut
27. Shock Pad

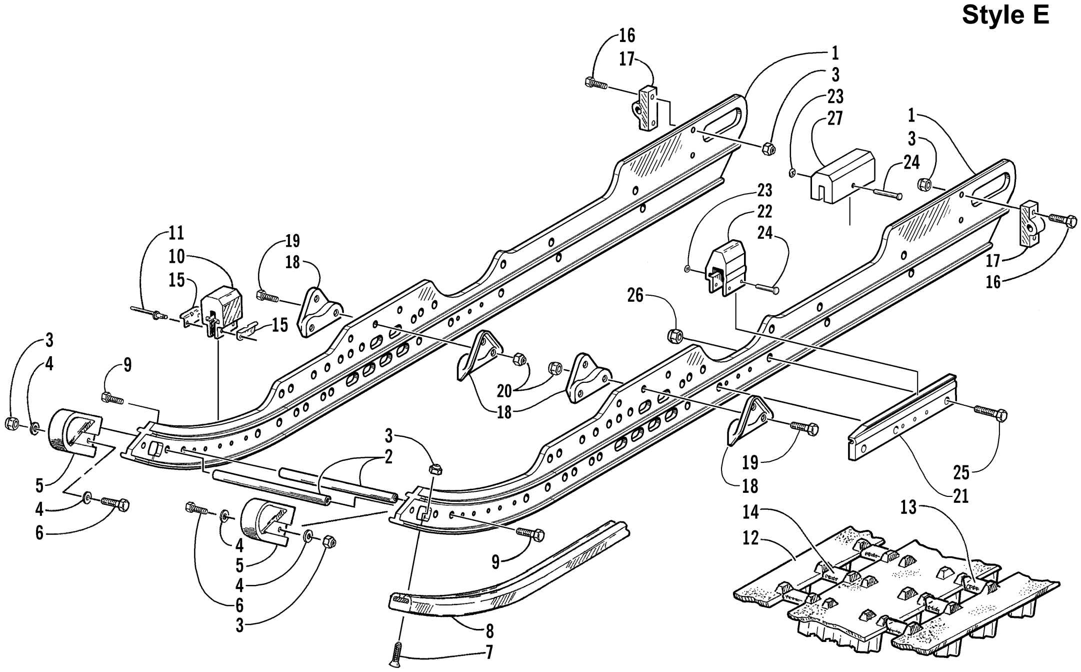


0735-262

Fig. 9-26

KEY
1. Formed Rail
2. Crossbrace
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Machine Screw
8. Wear Strip
9. Cap Screw
10. Shock Pad
11. Rivet
12. Track Assy
13. Guide Clip
14. Wear Clip
15. Retaining Bracket
16. Cap Screw
17. Track Adjuster
18. Mounting Bracket
19. Cap Screw
20. Lock Nut
21. Brace
22. Shock Pad
23. Push Nut
24. Rivet
25. Cap Screw
26. Lock Nut
27. Shock Pad

Style E

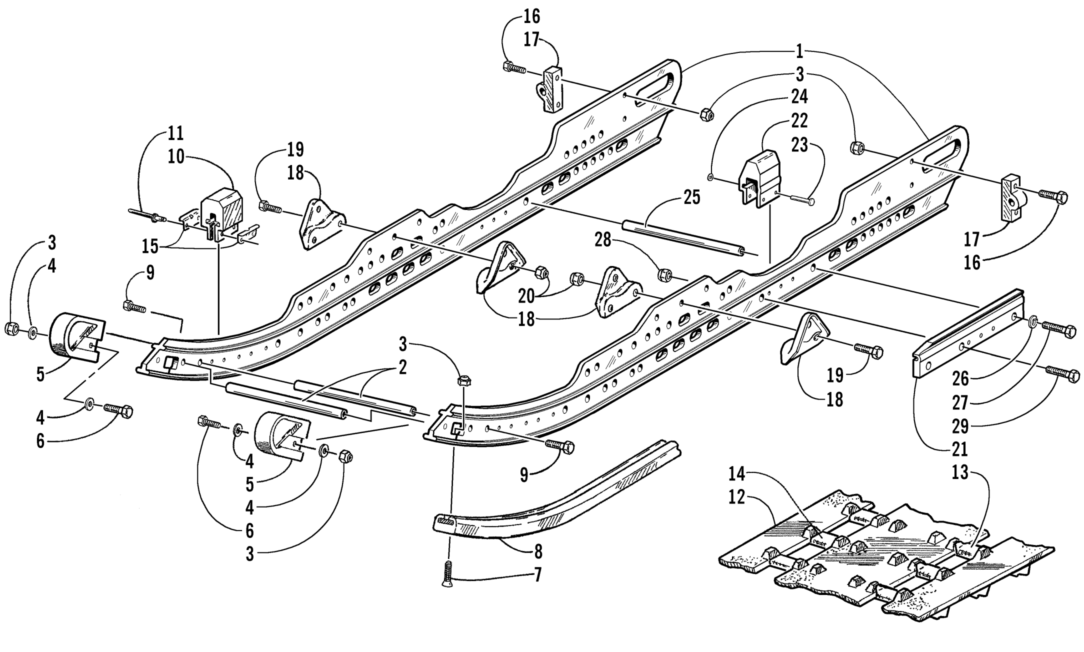


0735-276

Fig. 9-27

KEY
1. Formed Rail
2. Crossbrace
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Machine Screw
8. Wear Strip
9. Cap Screw
10. Shock Pad
11. Rivet
12. Track Assy
13. Guide Clip
14. Wear Clip
15. Retaining Bracket
16. Cap Screw
17. Track Adjuster
18. Mounting Bracket
19. Cap Screw
20. Lock Nut
21. Brace
22. Shock Pad
23. Rivet
24. Push Nut
25. Axle
26. Lock Washer
27. Cap Screw
28. Lock Nut
29. Cap Screw

Style F



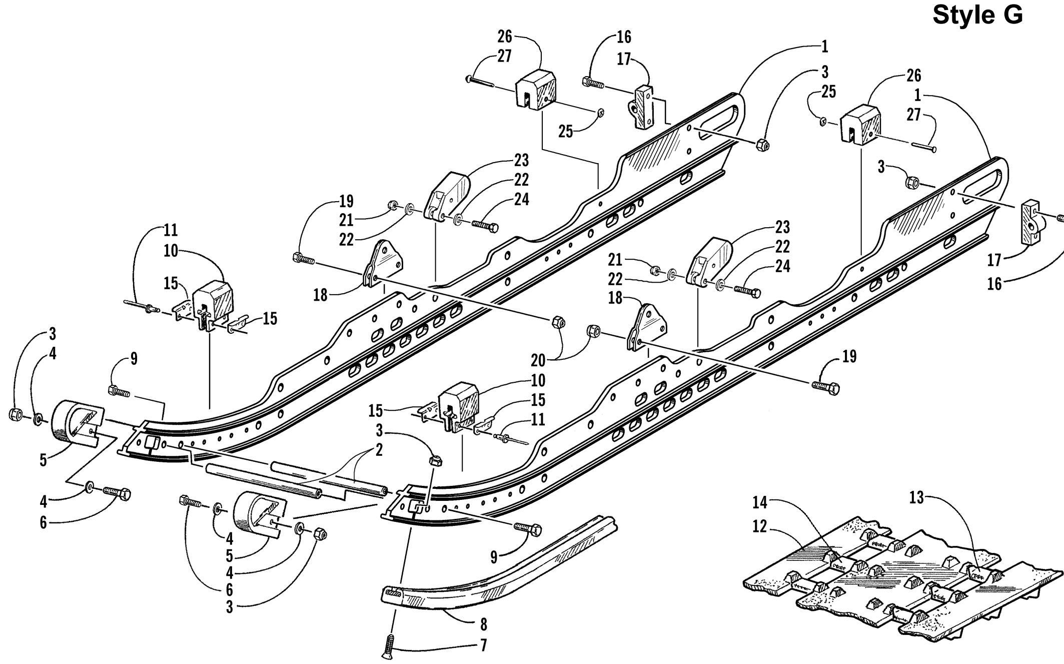
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Fig. 9-28

KEY
1. Formed Rail
2. Crossbrace
3. Lock Nut
4. Washer
5. End Cap
6. Cap Screw
7. Machine Screw
8. Wear Strip
9. Cap Screw
10. Pad
11. Rivet
12. Track Assy
13. Guide Clip
14. Wear Clip
15. Retaining Bracket
16. Cap Screw
17. Adjuster
18. Mounting Bracket
19. Cap Screw
20. Lock Nut
21. Lock Nut
22. Washer
23. Spring Tension Block
24. Screw
25. Push Nut
26. Pad
27. Rivet

Style G



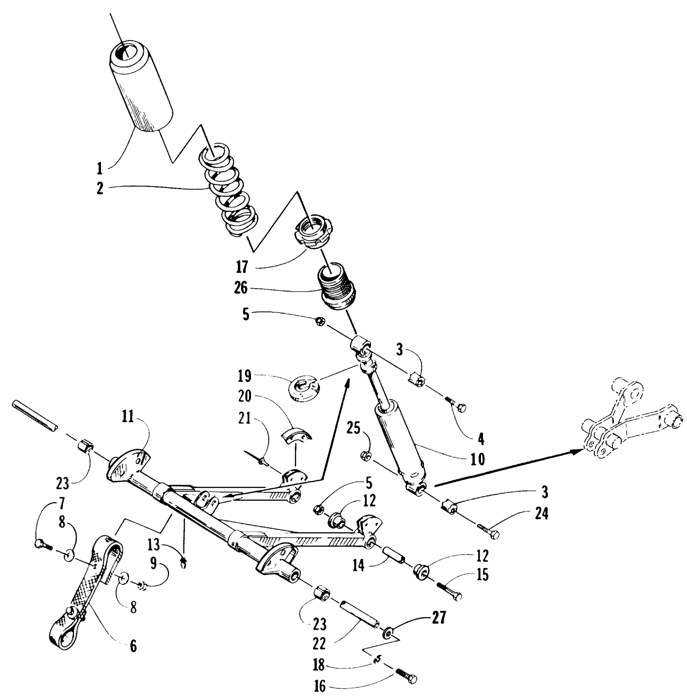
0734-227

Front Arm Schematics

Fig. 9-29

KEY
1. Compression Spring Cover
2. Compression Spring
3. Serrated Axle
4. Cap Screw
5. Lock Nut
6. Limiter Strap
7. Cap Screw
8. Washer
9. Lock Nut
10. Shock Absorber
11. Front Suspension Arm
12. Bushing
13. Grease Fitting
14. Front Arm Spacer
15. Cap Screw
16. Cap Screw
17. Retainer Nut
18. Lock Washer
19. Spring Retainer
20. Track Guide Bumper
21. Rivet
22. Inner Carriage Axle
23. Bearing
24. Cap Screw
25. Lock Nut
26. Threaded Sleeve
27. Washer

Style A

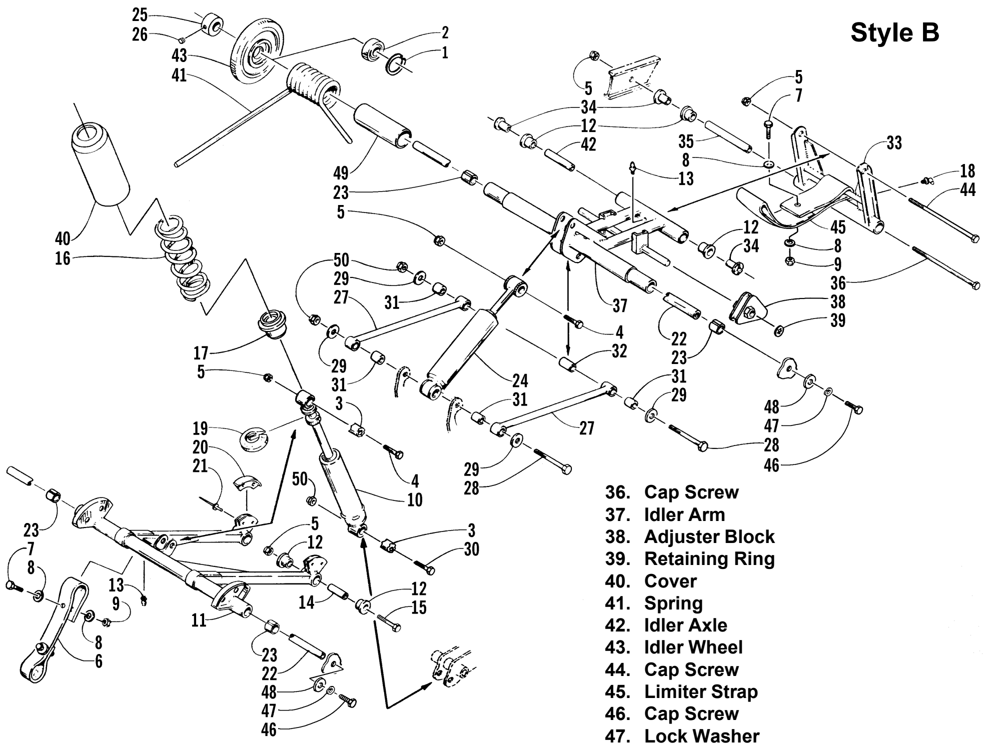


0733-527

Fig. 9-30

Style B

KEY
1. Retaining Ring
2. Bearing
3. Serrated Axle
4. Cap Screw
5. Lock Nut
6. Limiter
7. Cap Screw
8. Washer
9. Lock Nut
10. Shock Absorber
11. Front Suspension Arm
12. Bushing
13. Grease Fitting
14. Front Arm Spacer
15. Cap Screw
16. Compression Spring
17. Retainer Sleeve
18. Grease Fitting
19. Spring Retainer
20. Track Guide Bumper
21. Rivet
22. Inner Carriage Axle
23. Bearing
24. Shock Absorber
25. Lock Collar
26. Set Screw
27. Rear Shock Link
28. Cap Screw
29. Washer
30. Cap Screw
31. Link Axle
32. Shock Link Spacer
33. Rear Arm
34. Serrated Axle
35. Axle Tube
36. Cap Screw
37. Idler Arm
38. Adjuster Block
39. Retaining Ring
40. Cover
41. Spring
42. Idler Axle
43. Idler Wheel
44. Cap Screw
45. Limiter Strap
46. Cap Screw
47. Lock Washer
48. Washer
49. Sleeve
50. Lock Nut

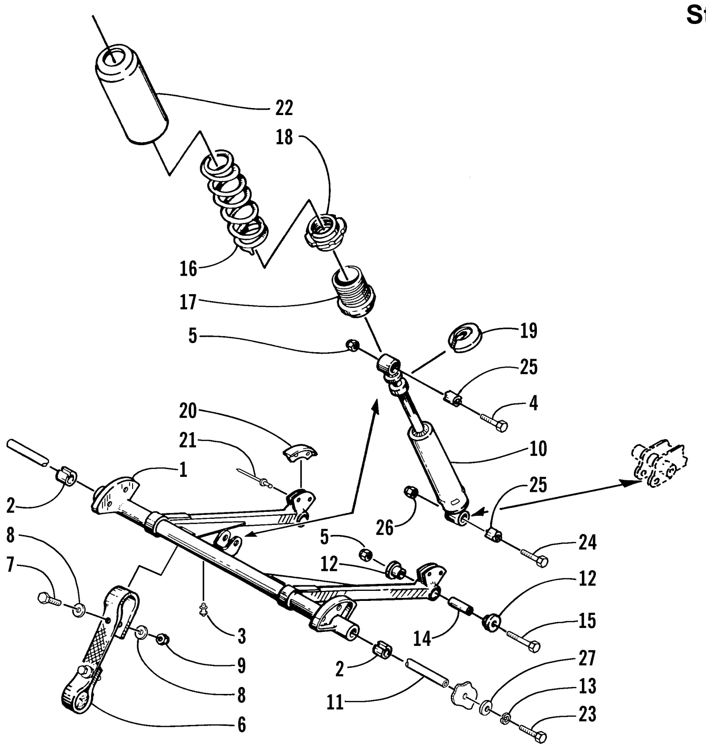


0734-571

Fig. 9-31

Style C

KEY
1. Front Suspension Arm
2. Bearing
3. Grease Fitting
4. Cap Screw
5. Lock Nut
6. Limiter Strap
7. Cap Screw
8. Washer
9. Lock Nut
10. Shock Absorber
11. Inner Carriage Axle
12. Bushing
13. Lock Washer
14. Spacer
15. Cap Screw
16. Compression Spring
17. Sleeve
18. Retainer Nut
19. Spring Retainer
20. Track Guide Bumper
21. Rivet
22. Compression Spring Cover
23. Cap Screw
24. Cap Screw
25. Serrated Axle
26. Lock Nut
27. Washer



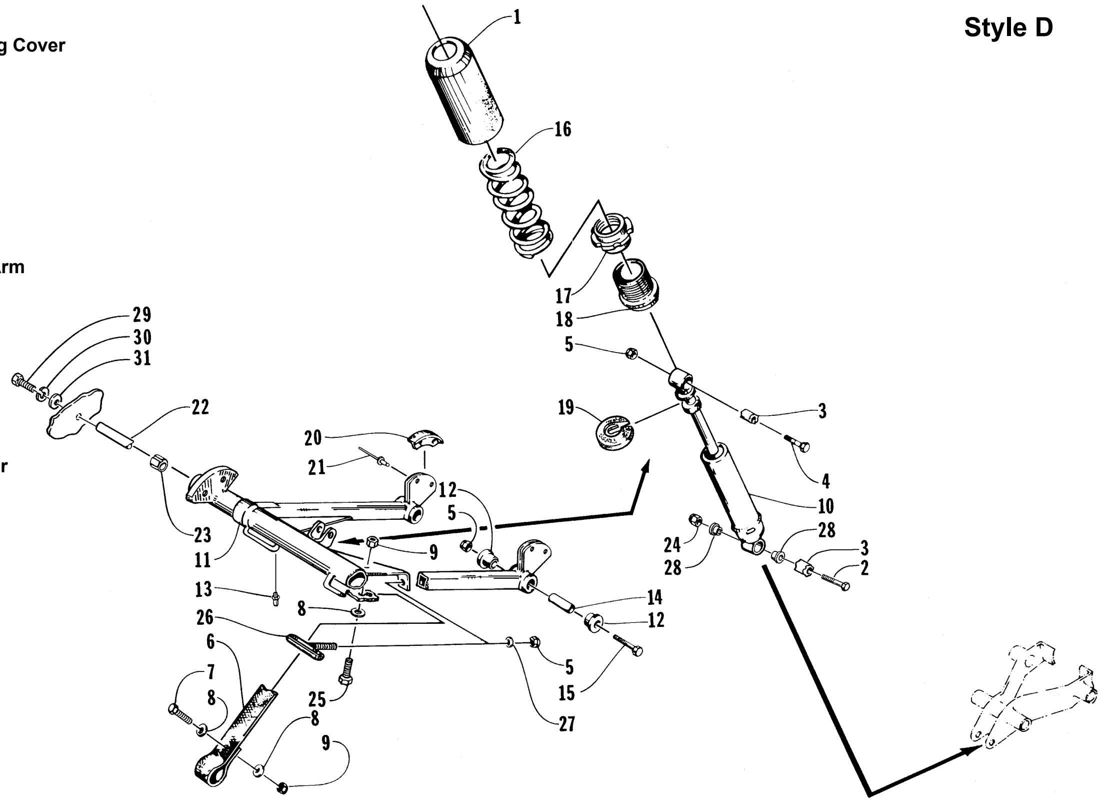
0734-612

9

Fig. 9-32

KEY
1. Compression Spring Cover
2. Cap Screw
3. Serrated Axle
4. Cap Screw
5. Lock Nut
6. Limiter Strap
7. Cap Screw
8. Washer
9. Lock Nut
10. Shock Absorber
11. Front Suspension Arm
12. Bushing
13. Grease Fitting
14. Front Arm Spacer
15. Cap Screw
16. Spring
17. Retainer Nut
18. Threaded Sleeve
19. Spring Retainer
20. Track Guide Bumper
21. Rivet
22. Inner Carriage Axle
23. Bearing
24. Lock Nut
25. Cap Screw
26. Front Arm Adjuster
27. Lock Washer
28. Bushing
29. Cap Screw
30. Lock Washer
31. Washer

Style D

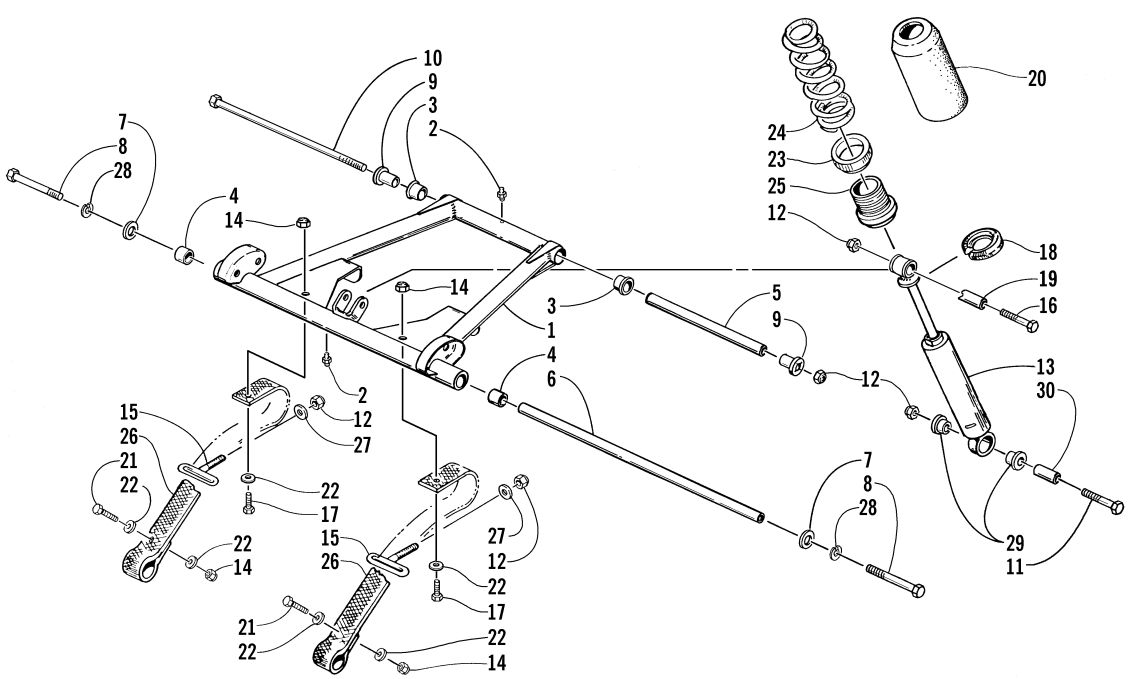


0731-891

Fig. 9-33

KEY
1. Front Arm
2. Grease Fitting
3. Bushing
4. Bearing
5. Axle Tube
6. Axle
7. Washer
8. Cap Screw
9. Axle
10. Cap Screw
11. Cap Screw
12. Lock Nut
13. Shock Absorber
14. Lock Nut
15. Adjuster
16. Cap Screw
17. Cap Screw
18. Spring Retainer
19. Axle
20. Cover
21. Cap Screw
22. Washer
23. Adjuster Nut
24. Spring
25. Threaded Sleeve
26. Limiter Strap
27. Washer
28. Lock Washer
29. Bushing
30. Axle

Style E

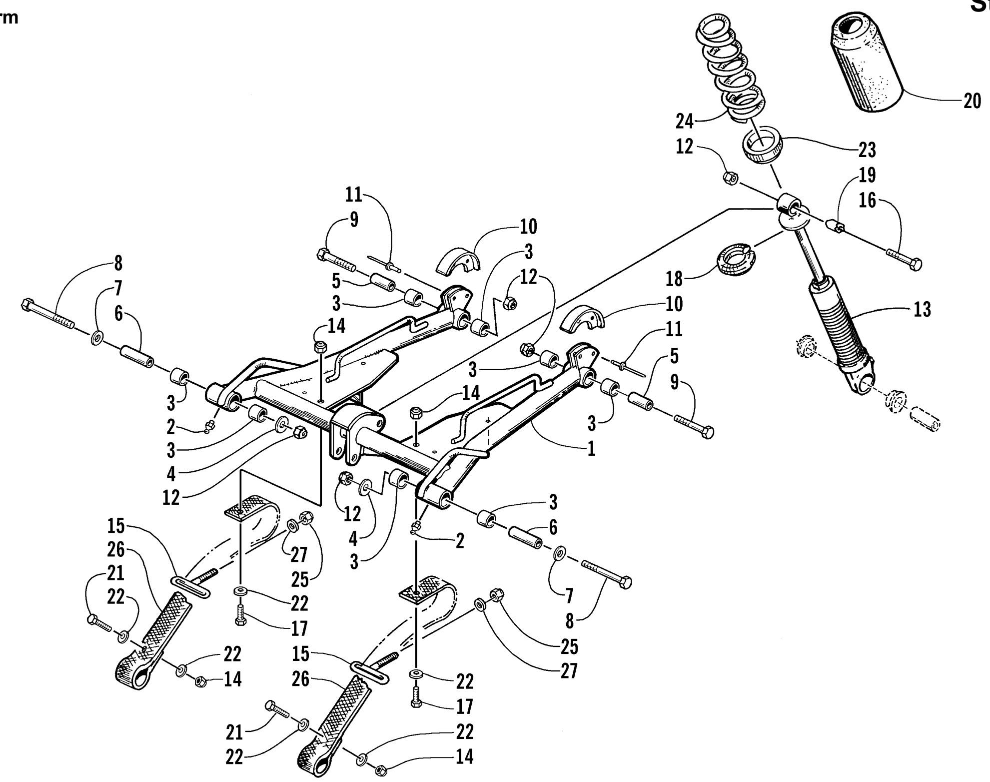


0733-384

Fig. 9-34

KEY
1. Front Suspension Arm
2. Grease Fitting
3. Bearing
4. Washer
5. Spacer
6. Axle
7. Washer
8. Cap Screw
9. Cap Screw
10. Bumper
11. Rivet
12. Lock Nut
13. Shock Absorber
14. Lock Nut
15. Adjuster
16. Cap Screw
17. Cap Screw
18. Retainer
19. Axle
20. Cover
21. Cap Screw
22. Washer
23. Adjuster Nut
24. Spring
25. Lock Nut
26. Limiter Strap
27. Washer

Style F

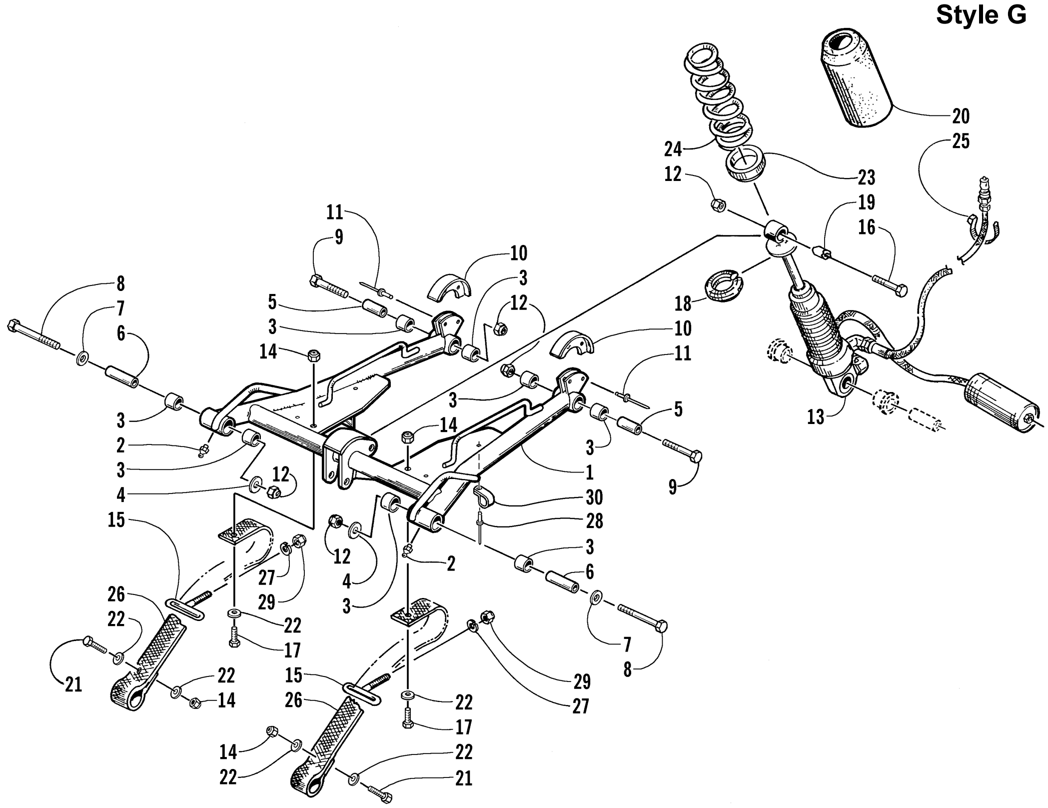


0735-036

Fig. 9-35

KEY
1. Front Suspension Arm
2. Grease Fitting
3. Bushing
4. Washer
5. Spacer
6. Inner Carriage Axle
7. Washer
8. Cap Screw
9. Cap Screw
10. Bumper
11. Rivet
12. Lock Nut
13. Shock Absorber
14. Lock Nut
15. Adjuster
16. Cap Screw
17. Cap Screw
18. Retainer
19. Axle
20. Cover
21. Cap Screw
22. Washer
23. Adjuster Nut
24. Spring
25. Cable Tie
26. Limiter Strap
27. Washer
28. Rivet
29. Lock Nut
30. Clamp

Style G

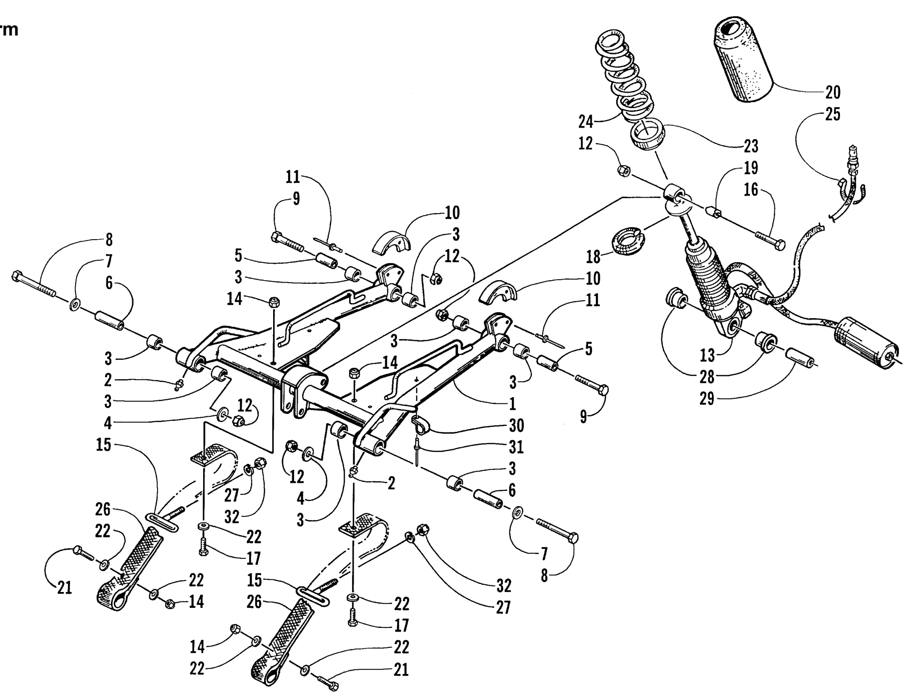


0735-415

Fig. 9-36

Style H

KEY
1. Front Suspension Arm
2. Grease Fitting
3. Bearing
4. Washer
5. Spacer
6. Axle
7. Washer
8. Cap Screw
9. Cap Screw
10. Bumper
11. Rivet
12. Lock Nut
13. Shock Absorber
14. Lock Nut
15. Adjuster
16. Cap Screw
17. Cap Screw
18. Retainer
19. Axle
20. Cover
21. Cap Screw
22. Washer
23. Adjuster Nut
24. Spring
25. Cable Tie
26. Limiter Strap
27. Washer
28. Bushing
29. Sleeve
30. Clamp
31. Rivet
32. Lock Nut



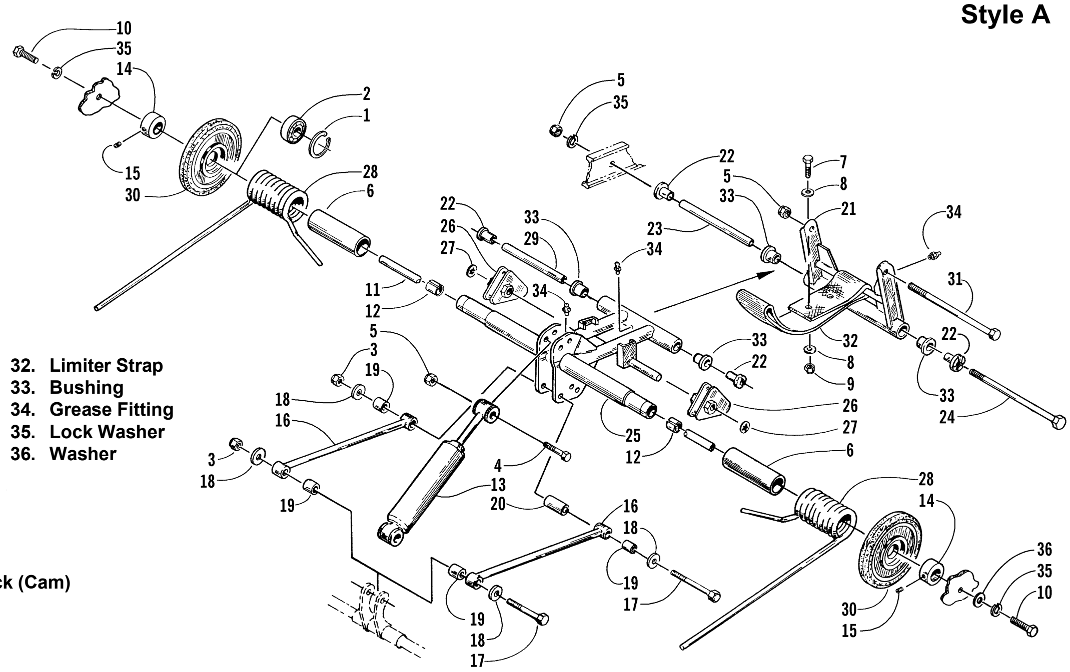
0734-662

Rear Arm Schematics

Fig. 9-37

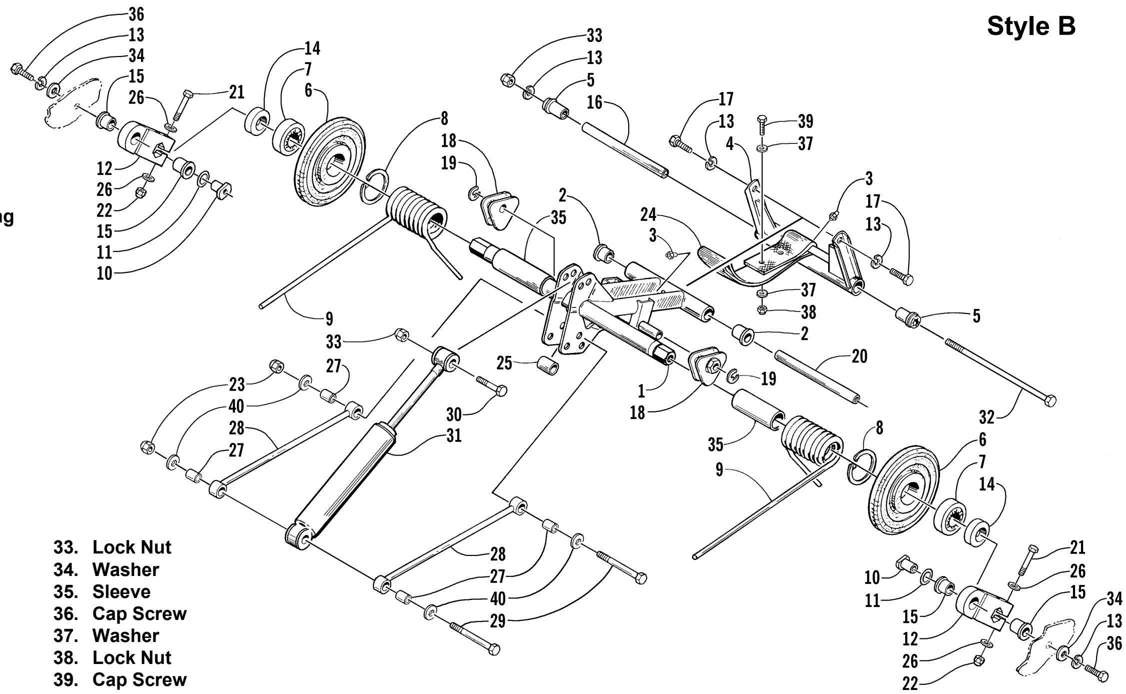
Style A

KEY
1. Retaining Ring
2. Bearing
3. Lock Nut
4. Cap Screw
5. Lock Nut
6. Spring Sleeve
7. Cap Screw
8. Washer
9. Lock Nut
10. Cap Screw
11. Inner Carriage Axle
12. Bearing
13. Shock Absorber
14. Lock Collar
15. Set Screw
16. Rear Shock Link
17. Cap Screw
18. Washer
19. Link Axle
20. Link Spacer
21. Rear Arm
22. Serrated Axle
23. Axle Tube
24. Cap Screw
25. Idler Arm
26. Spring Adjuster Block (Cam)
27. Retaining Ring
28. Spring
29. Idler Axle
30. Idler Wheel
31. Cap Screw
32. Limiter Strap
33. Bushing
34. Grease Fitting
35. Lock Washer
36. Washer



0735-075

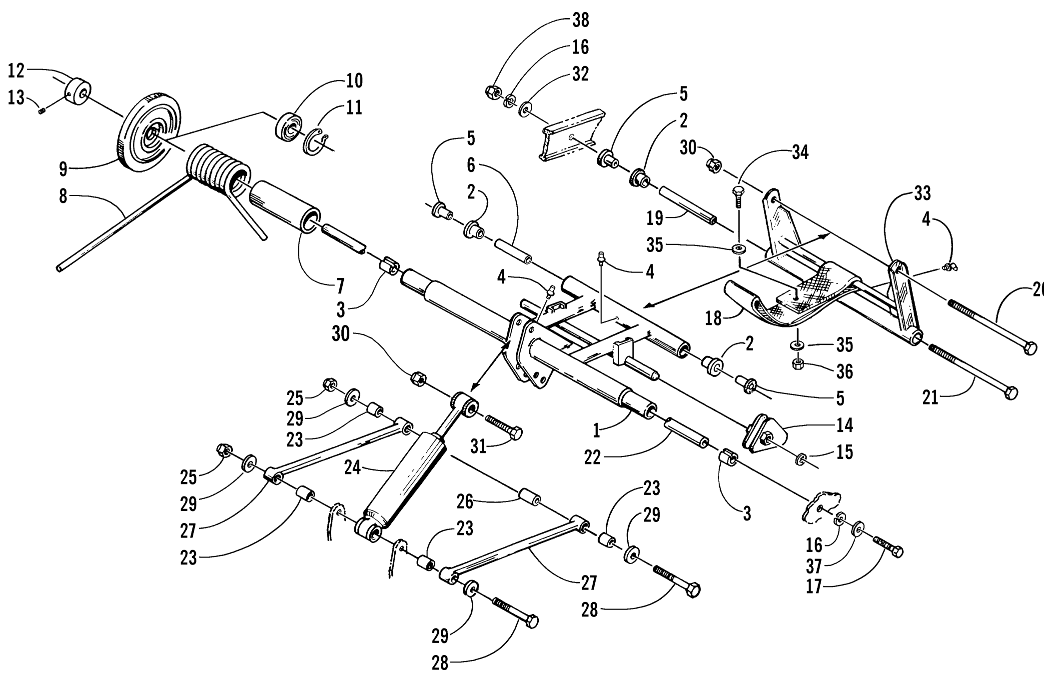
Fig. 9-38



KEY
1. Idler Arm
2. Bushing
3. Grease Fitting
4. Rear Arm
5. Axle
6. Idler Wheel
7. Bearing
8. Retaining Ring
9. Suspension Spring
10. Axle
11. Washer
12. Offset Pivot Idler
13. Lock Washer
14. Spacer
15. Bushing
16. Axle Tube
17. Cap Screw
18. Spring Block
19. Retainer Ring
20. Axle
21. Cap Screw
22. Nut
23. Lock Nut
24. Limiter Strap
25. Spacer
26. Washer
27. Link Axle
28. Link
29. Cap Screw
30. Cap Screw
31. Shock Absorber
32. Cap Screw
33. Lock Nut
34. Washer
35. Sleeve
36. Cap Screw
37. Washer
38. Lock Nut
39. Cap Screw
40. Washer

0735-042

Fig. 9-39



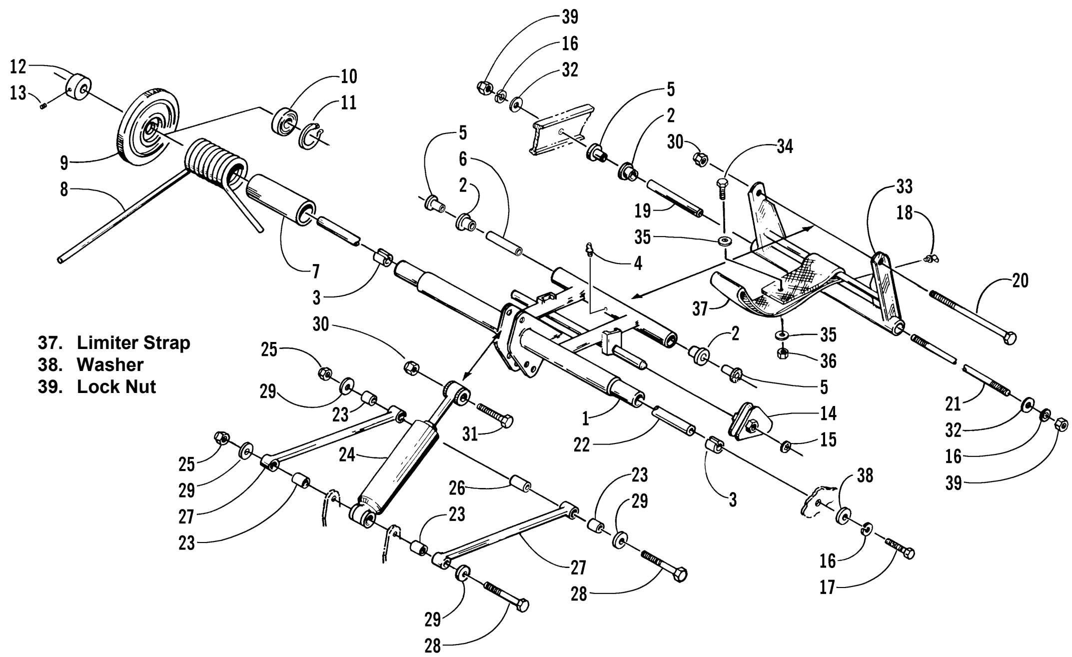
KEY
1. Idler Arm
2. Bushing
3. Bearing
4. Grease Fitting
5. Serrated Axle
6. Idler Axle
7. Sleeve
8. Suspension Spring
9. Idler Wheel
10. Bearing
11. Retaining Ring
12. Lock Collar
13. Set Screw
14. Cam (Adjuster Block)
15. Retaining Ring
16. Lock Washer
17. Cap Screw
18. Limiter Strap
19. Axle Tube
20. Cap Screw
21. Cap Screw
22. Inner Carriage Axle
23. Link Axle
24. Shock Absorber
25. Lock Nut
26. Spacer
27. Rear Shock Link
28. Cap Screw
29. Washer
30. Lock Nut
31. Cap Screw
32. Washer
33. Rear Arm
34. Cap Screw
35. Washer
36. Lock Nut
37. Washer

0735-010

Fig. 9-40

Style D

KEY
1. Idler Arm
2. Bushing
3. Bearing
4. Grease Fitting
5. Serrated Axle
6. Idler Axle
7. Sleeve
8. Spring
9. Idler Wheel
10. Bearing
11. Retaining Ring
12. Lock Collar
13. Set Screw
14. Spring Adjuster Block
15. Retaining Ring
16. Lock Washer
17. Cap Screw
18. Grease Fitting
19. Axle Tube
20. Cap Screw
21. Stud Bolt
22. Inner Carriage Axle
23. Link Axle
24. Shock Absorber
25. Lock Nut
26. Spacer
27. Rear Shock Link
28. Cap Screw
29. Washer
30. Lock Nut
31. Cap Screw
32. Washer
33. Rear Arm
34. Cap Screw
35. Washer
36. Lock Nut
37. Limiter Strap
38. Washer
39. Lock Nut

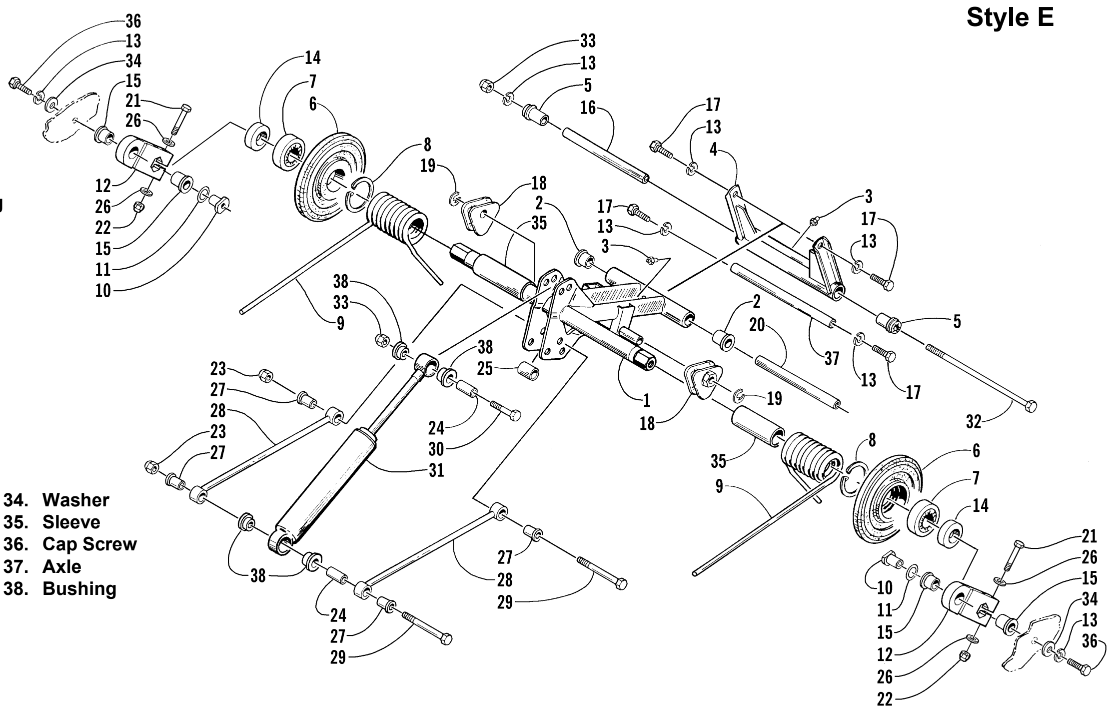


0734-941

Fig. 9-41

Style E

KEY
1. Idler Arm
2. Bushing
3. Grease Fitting
4. Rear Arm
5. Axle
6. Idler Wheel
7. Bearing
8. Retaining Ring
9. Suspension Spring
10. Axle
11. Washer
12. Pivot Idler
13. Lock Washer
14. Spacer
15. Bushing
16. Axle Tube
17. Cap Screw
18. Spring Block
19. Retainer Ring
20. Axle
21. Cap Screw
22. Nut
23. Lock Nut
24. Sleeve
25. Spacer
26. Washer
27. Link Axle
28. Link
29. Cap Screw
30. Cap Screw
31. Shock Absorber
32. Cap Screw
33. Lock Nut
34. Washer
35. Sleeve
36. Cap Screw
37. Axle
38. Bushing

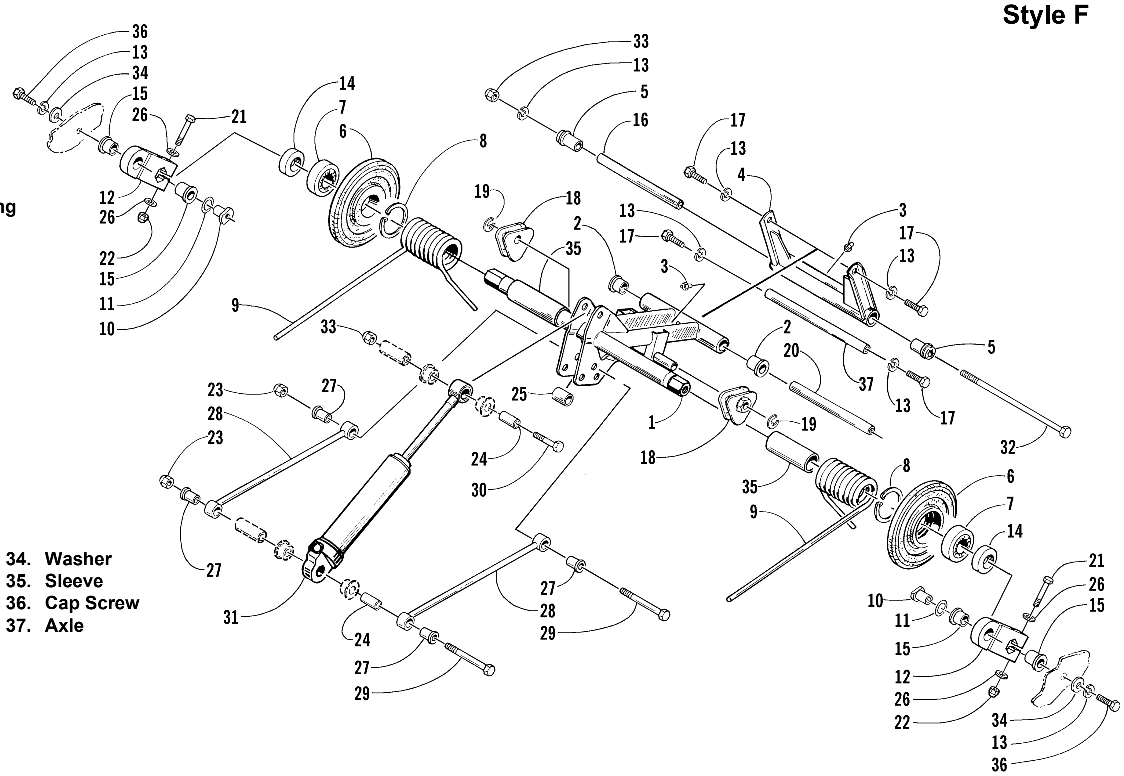


0734-972

Fig. 9-42

KEY
1. Idler Arm
2. Bushing
3. Grease Fitting
4. Rear Arm
5. Axle
6. Idler Wheel
7. Bearing
8. Retaining Ring
9. Suspension Spring
10. Axle
11. Washer
12. Offset Pivot Idler
13. Lock Washer
14. Spacer
15. Bushing
16. Axle Tube
17. Cap Screw
18. Spring Block
19. Retainer Ring
20. Axle
21. Cap Screw
22. Lock Nut
23. Lock Nut
24. Sleeve
25. Spacer
26. Washer
27. Link Axle
28. Link
29. Cap Screw
30. Cap Screw
31. Shock Absorber
32. Cap Screw
33. Lock Nut
34. Washer
35. Sleeve
36. Cap Screw
37. Axle

Style F

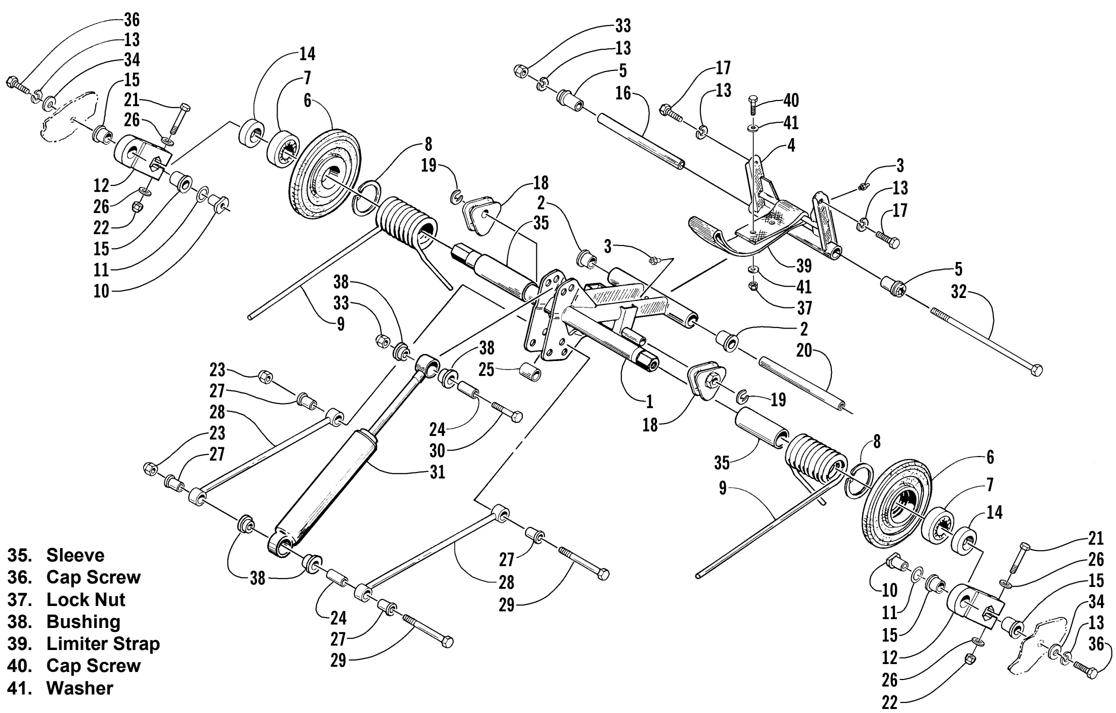


0735-038

Fig. 9-43

KEY
1. Idler Arm
2. Bushing
3. Grease Fitting
4. Rear Arm
5. Axle
6. Idler Wheel
7. Bearing
8. Retaining Ring
9. Suspension Spring
10. Axle
11. Washer
12. Offset Pivot Idler
13. Lock Washer
14. Spacer
15. Bushing
16. Axle Tube
17. Cap Screw
18. Spring Block
19. Retainer Ring
20. Axle
21. Cap Screw
22. Lock Nut
23. Lock Nut
24. Sleeve
25. Spacer
26. Washer
27. Link Axle
28. Link
29. Cap Screw
30. Cap Screw
31. Shock Absorber
32. Cap Screw
33. Lock Nut
34. Washer
35. Sleeve
36. Cap Screw
37. Lock Nut
38. Bushing
39. Limiter Strap
40. Cap Screw
41. Washer

Style G



0735-317

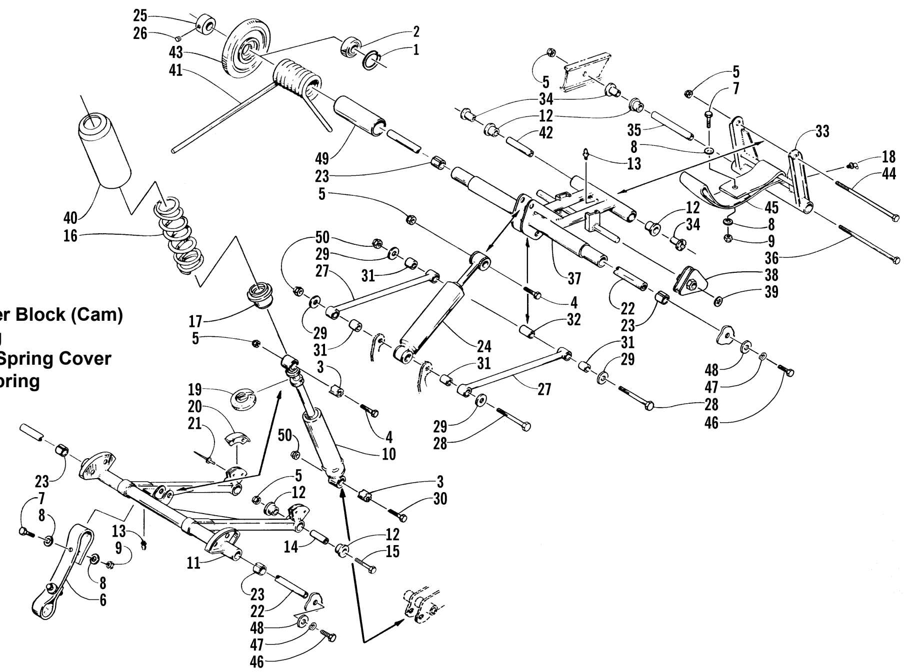
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Fig. 9-44

KEY

1. Retaining Ring
2. Bearing
3. Serrated Axle
4. Cap Screw
5. Lock Nut
6. Limiter Strap
7. Cap Screw
8. Washer
9. Lock Nut
10. Shock Absorber
11. Front Suspension Arm
12. Bushing
13. Grease Fitting
14. Front Arm Spacer
15. Cap Screw
16. Compression Spring
17. Retainer Spring
18. Grease Fitting
19. Spring Retainer
20. Track Guide Bumper
21. Rivet
22. Inner Carriage Axle
23. Bearing
24. Shock Absorber
25. Lock Collar
26. Set Screw
27. Rear Shock Link
28. Cap Screw
29. Washer
30. Cap Screw
31. Link Axle
32. Shock Link Spacer
33. Rear Arm
34. Serrated Axle
35. Axle Tube
36. Cap Screw
37. Idler Arm
38. Spring Adjuster Block (Cam)
39. Retaining Ring
40. Compression Spring Cover
41. Suspension Spring
42. Idler Axle
43. Idler Wheel
44. Cap Screw
45. Limiter Strap
46. Cap Screw
47. Lock Washer
48. Washer
49. Spring Sleeve
50. Lock Nut

Style H



0734-571

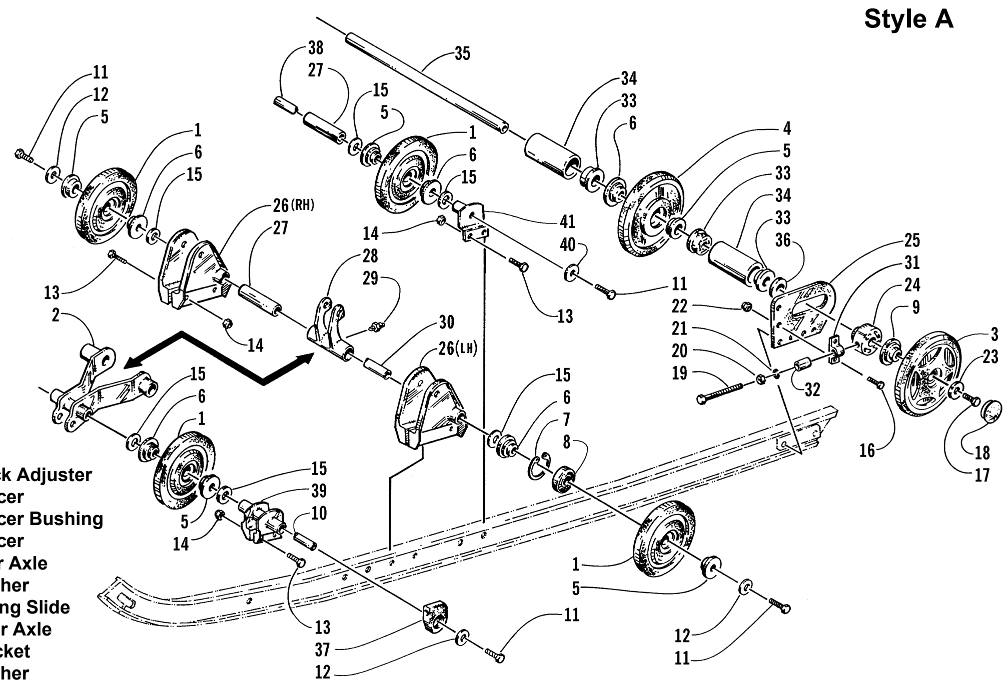
Idler Wheels Schematics

Fig. 9-45

KEY

1. Idler Wheel
2. Bracket
3. Idler Wheel
4. Idler Wheel
5. Wheel Insert
6. Wheel Insert
7. Retaining Ring
8. Bearing
9. Wheel Insert
10. Idler Wheel Axle
11. Cap Screw
12. Washer
13. Cap Screw
14. Lock Nut
15. Washer
16. Cap Screw
17. Cap Screw
18. Cap
19. Cap Screw
20. Nut
21. Lock Washer
22. Lock Nut
23. Washer
24. Adjuster Bushing
25. Rear Axle Housing
26. Mounting Bracket
27. Idler Wheel Spacer
28. Shock Pivot
29. Grease Fitting
30. Idler Wheel Axle
31. Track Adjuster
32. Track Adjuster Spacer
33. Spacer Bushing
34. Spacer
35. Rear Axle
36. Washer
37. Spring Slide
38. Inner Axle
39. Bracket
40. Washer
41. Bracket

Style A

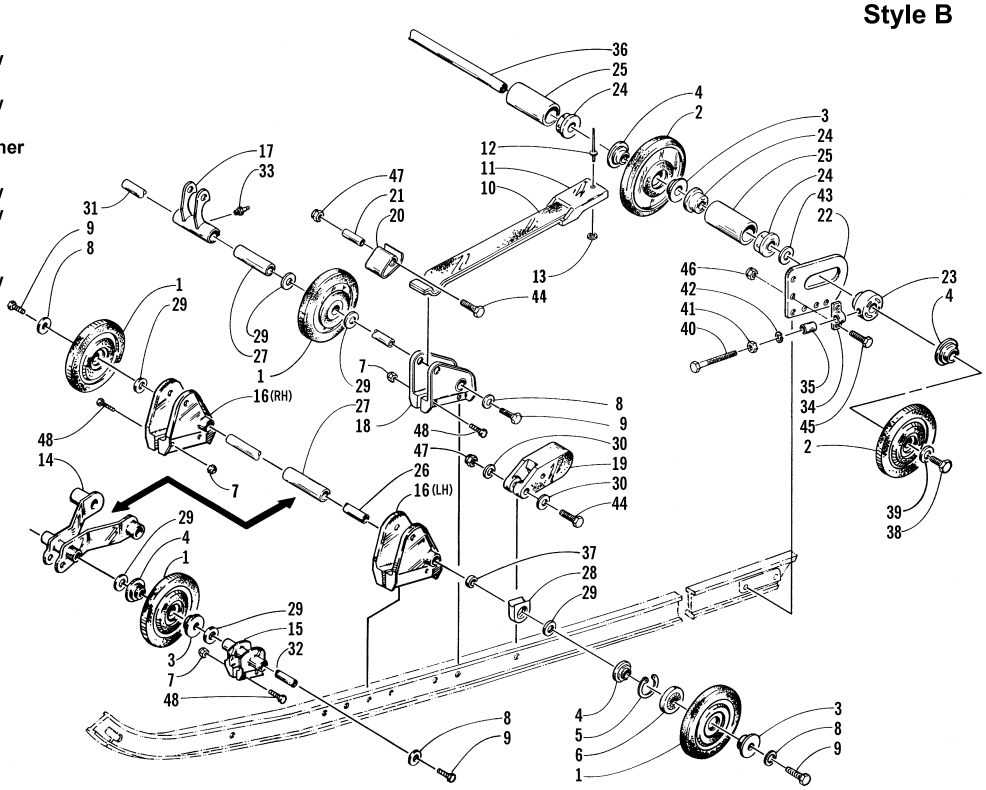


0734-130

Fig. 9-46

KEY
1. Idler Wheel
2. Idler Wheel
3. Wheel Insert
4. Wheel Insert
5. Retaining Plug
6. Bearing
7. Lock Nut
8. Washer
9. Cap Screw
10. Overload Spring
11. Wear Block
12. Rivet
13. Washer
14. Front Shock Bracket
15. Bracket
16. Mounting Bracket
17. Shock Pivot
18. Mounting Bracket
19. Spring Tension Block
20. Retainer Clip
21. Bushing
22. Rear Axle Housing
23. Adjuster Bushing
24. Spacer Bushing
25. Center Spacer
26. Inner Wheel Axle
27. Idler Wheel Spacer
28. Roller Slide
29. Washer
30. Washer
31. Inner Axle
32. Idler Wheel Axle
33. Grease Fitting
34. Track Adjuster
35. Track Adjuster Spacer
36. Axle
37. Spacer
38. Cap Screw
39. Washer
40. Cap Screw
41. Nut
42. Lock Washer
43. Washer
44. Cap Screw
45. Cap Screw
46. Lock Nut
47. Nut
48. Cap Screw

Style B

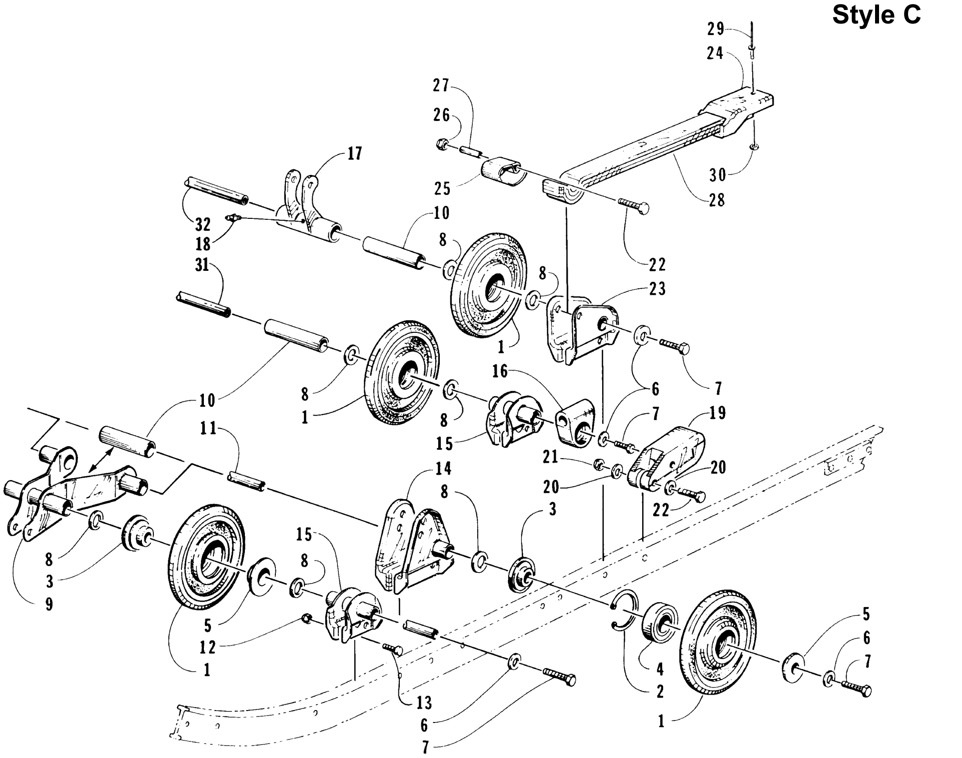


0734-560

Fig. 9-47

KEY
1. Idler Wheel
2. Retaining Ring
3. Wheel Insert
4. Bearing
5. Wheel Insert
6. Washer
7. Cap Screw
8. Washer
9. Front Shock Bracket
10. Idler Wheel Spacer
11. Idler Wheel Axle
12. Lock Nut
13. Cap Screw
14. Mounting Bracket
15. Auxiliary Wheel Bracket
16. Spring Slide
17. Shock Pivot
18. Grease Fitting
19. Spring Tension Block
20. Washer
21. Lock Nut
22. Cap Screw
23. Mounting Bracket
24. Wear Block
25. Retaining Clip
26. Lock Nut
27. Overload Bushing
28. Overload Spring
29. Rivet
30. Washer
31. Idler Wheel Axle
32. Inner Axle

Style C

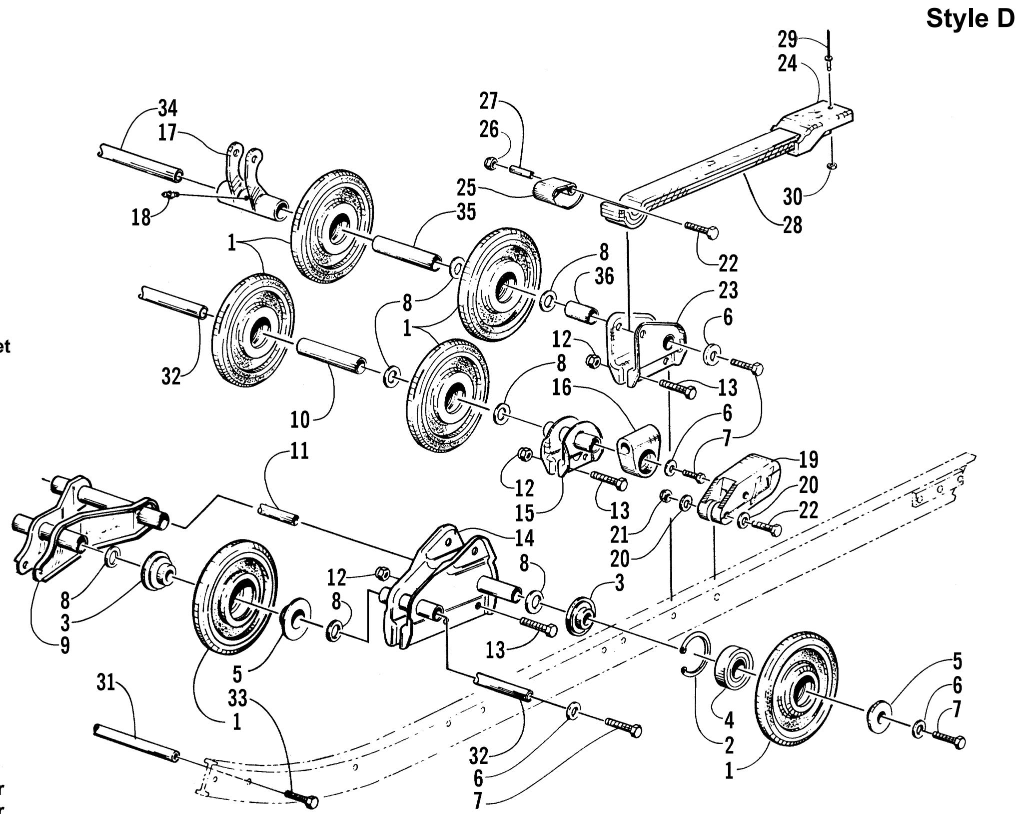


0732-758

9

Fig. 9-48

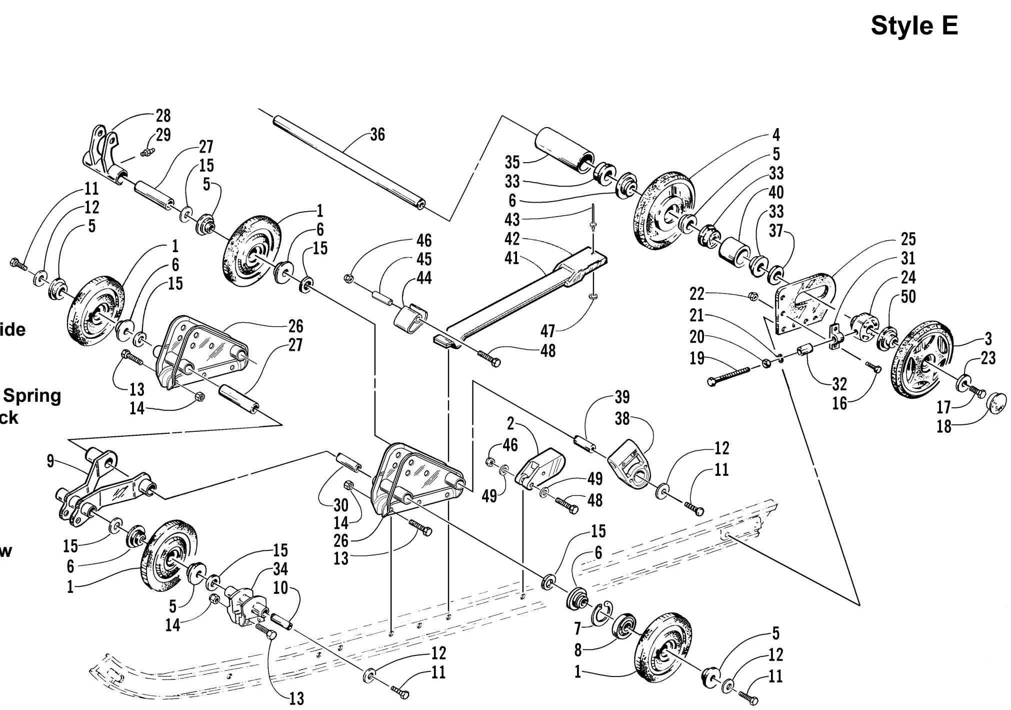
KEY
1. Idler Wheel
2. Retaining Ring
3. Wheel Insert
4. Bearing
5. Wheel Insert
6. Washer
7. Cap Screw
8. Washer
9. Front Shock Bracket
10. Idler Wheel Spacer
11. Idler Wheel Axle
12. Lock Nut
13. Cap Screw
14. Mounting Bracket
15. Auxiliary Wheel Bracket
16. Spring Slide
17. Shock Pivot
18. Grease Fitting
19. Spring Tension Block
20. Washer
21. Lock Nut
22. Cap Screw
23. Mounting Bracket
24. Wear Block
25. Retaining Clip
26. Lock Nut
27. Overload Bushing
28. Overload Spring
29. Rivet
30. Washer
31. Support
32. Front Shock Axle
33. Cap Screw
34. Axle
35. Auxiliary Wheel Spacer
36. Auxiliary Wheel Spacer



0734-684

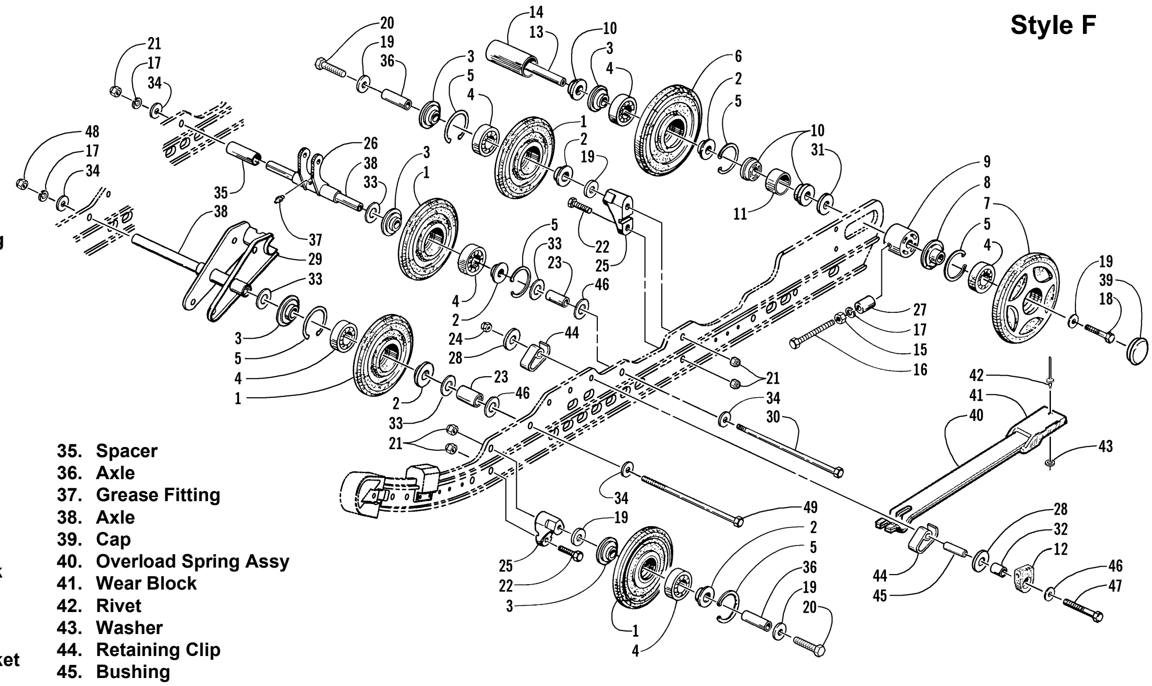
Fig. 9-49

KEY
1. Idler Wheel
2. Tension Block
3. Idler Wheel
4. Idler Wheel
5. Insert
6. Insert
7. Retaining Ring
8. Bearing
9. Mounting Bracket
10. Axle
11. Cap Screw
12. Washer
13. Cap Screw
14. Lock Nut
15. Washer
16. Cap Screw
17. Cap Screw
18. Cap
19. Cap Screw
20. Nut
21. Lock Washer
22. Lock Nut
23. Washer
24. Bushing
25. Housing
26. Bracket
27. Spacer
28. Pivot
29. Grease Fitting
30. Axle
31. Track Adjuster
32. Spacer
33. Bushing
34. Bracket
35. Spacer
36. Axle
37. Washer
38. Spring Slide
39. Axle
40. Spacer
41. Overload Spring
42. Wear Block
43. Rivet
44. Clip
45. Bushing
46. Lock Nut
47. Washer
48. Cap Screw
49. Washer
50. Insert



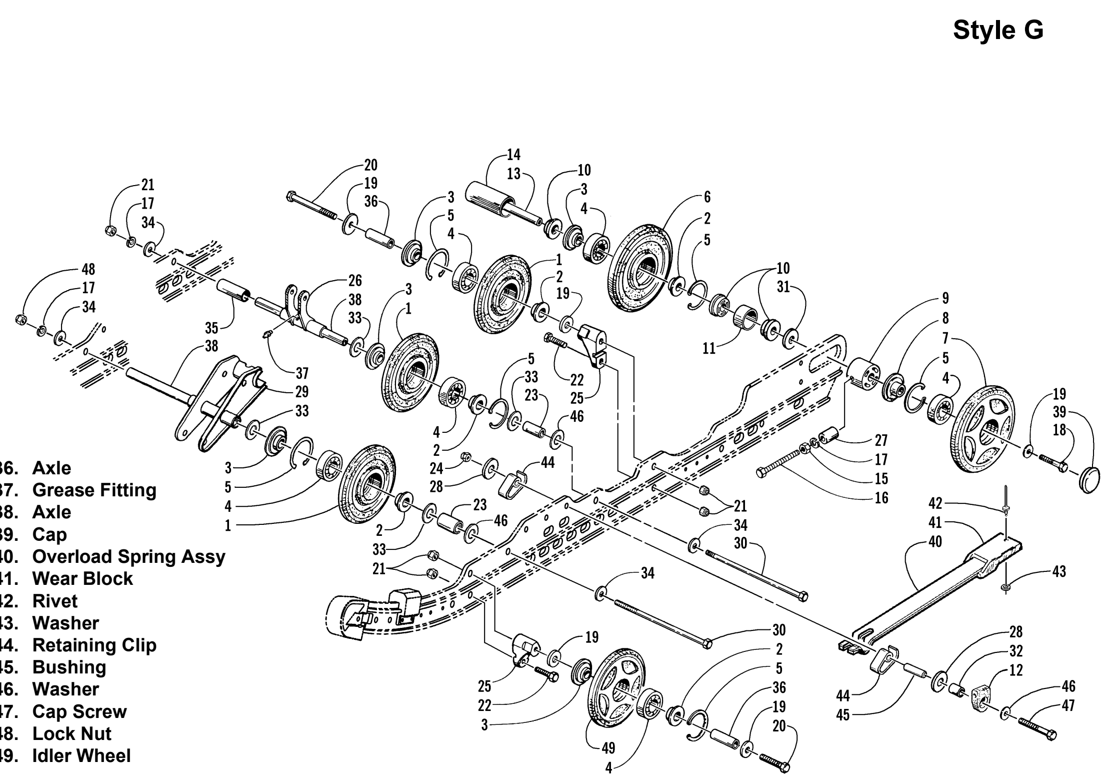
0735-080

Fig. 9-50



KEY
1. Idler Wheel
2. Insert
3. Insert
4. Bearing
5. Retaining Ring
6. Idler Wheel
7. Idler Wheel
8. Insert
9. Bushing
10. Spacer Bushing
11. Spacer
12. Spring Slide
13. Axle
14. Spacer
15. Nut
16. Cap Screw
17. Lock Washer
18. Cap Screw
19. Washer
20. Cap Screw
21. Lock Nut
22. Cap Screw
23. Spacer
24. Hex Nut
25. Mounting Block
26. Pivot
27. Spacer
28. Washer
29. Mounting Bracket
30. Cap Screw
31. Washer
32. Spacer
33. Washer
34. Washer
35. Spacer
36. Axle
37. Grease Fitting
38. Axle
39. Cap
40. Overload Spring Assy
41. Wear Block
42. Rivet
43. Washer
44. Retaining Clip
45. Bushing
46. Washer
47. Cap Screw
48. Lock Nut
49. Cap Screw

Fig. 9-51



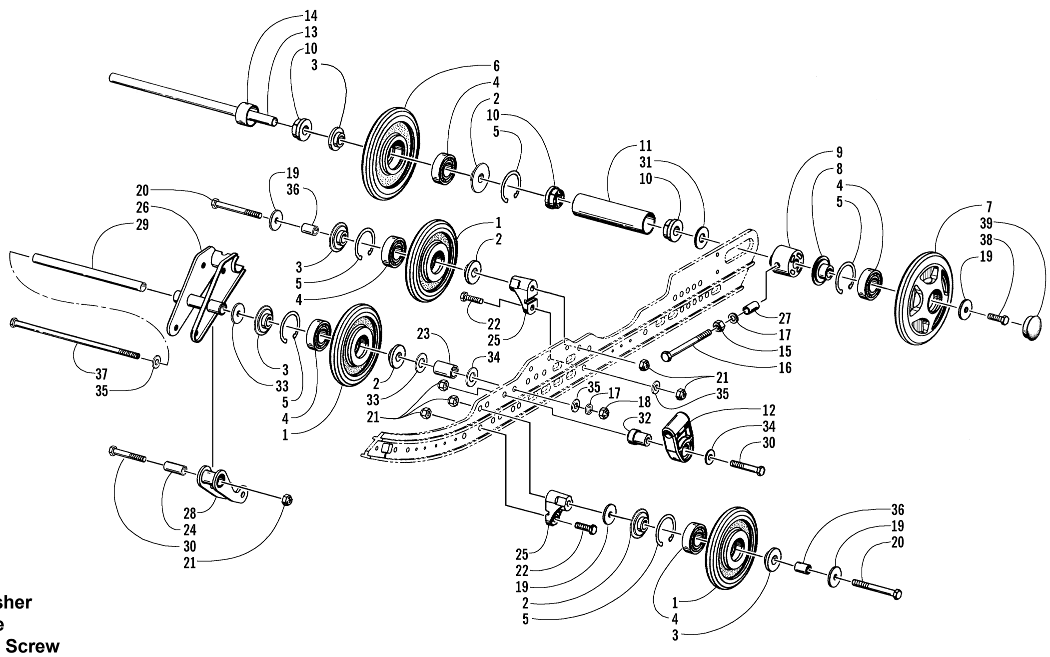
KEY
1. Idler Wheel
2. Insert
3. Insert
4. Bearing
5. Retaining Ring
6. Idler Wheel
7. Idler Wheel
8. Insert
9. Bushing
10. Spacer Bushing
11. Spacer
12. Spring Slide
13. Axle
14. Spacer
15. Nut
16. Cap Screw
17. Lock Washer
18. Cap Screw
19. Washer
20. Cap Screw
21. Lock Nut
22. Cap Screw
23. Spacer
24. Lock Nut
25. Mounting Block
26. Pivot
27. Spacer
28. Washer
29. Mounting Bracket
30. Cap Screw
31. Washer
32. Spacer
33. Washer
34. Washer
35. Spacer
36. Axle
37. Grease Fitting
38. Axle
39. Cap
40. Overload Spring Assy
41. Wear Block
42. Rivet
43. Washer
44. Retaining Clip
45. Bushing
46. Washer
47. Cap Screw
48. Lock Nut
49. Idler Wheel

Fig. 9-52

Style H

KEY

1. Idler Wheel
2. Wheel Insert
3. Wheel Insert
4. Bearing
5. Retaining Ring
6. Idler Wheel
7. Idler Wheel
8. Wheel Insert
9. Adjuster Bushing
10. Spacer Bushing
11. Spacer
12. Spring Slide
13. Axle
14. Spacer
15. Nut
16. Cap Screw
17. Lock Washer
18. Flex-Lock Nut
19. Washer
20. Cap Screw
21. Lock Nut
22. Cap Screw
23. Spacer
24. Axle
25. Mounting Block
26. Bracket
27. Spacer
28. Pivot
29. Axle
30. Cap Screw
31. Washer
32. Slide Block
33. Washer
34. Washer
35. Washer
36. Axle
37. Cap Screw
38. Cap Screw
39. Idler Wheel Cap



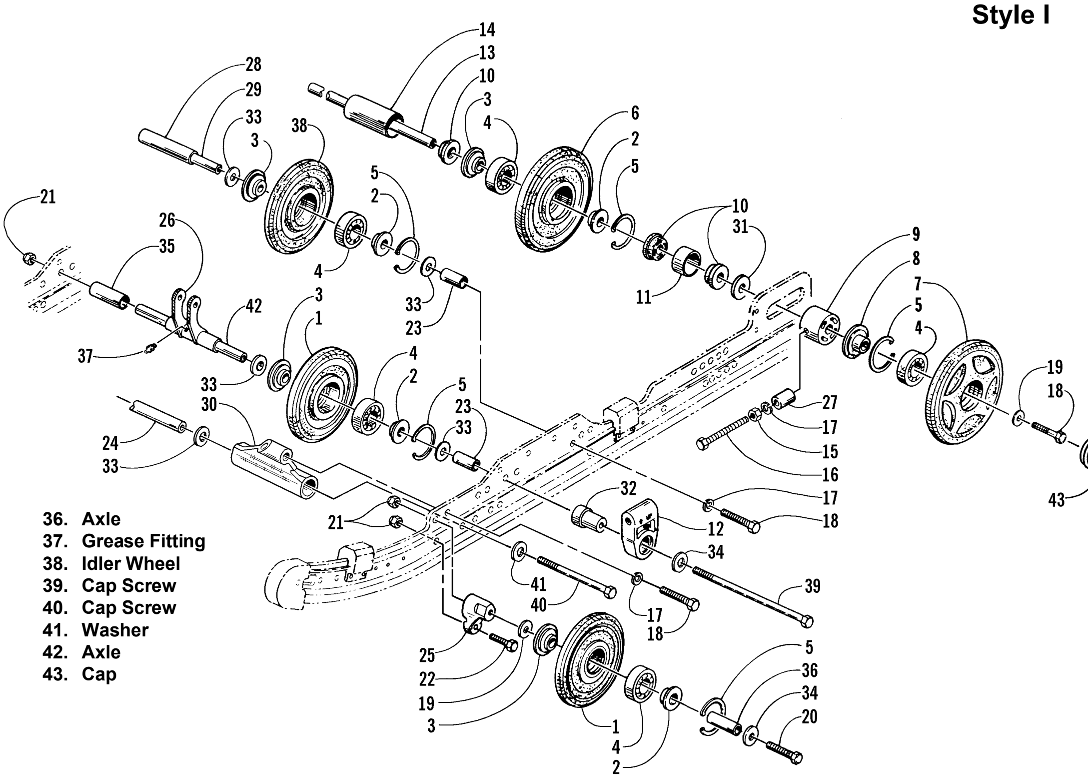
0734-970

Fig. 9-53

Style I

KEY

1. Idler Wheel
2. Wheel Insert
3. Wheel Insert
4. Bearing
5. Retaining Ring
6. Idler Wheel
7. Idler Wheel
8. Wheel Insert
9. Adjuster Bushing
10. Spacer Bushing
11. Spacer
12. Spring Slide
13. Axle
14. Spacer
15. Nut
16. Cap Screw
17. Lock Washer
18. Cap Screw
19. Washer
20. Cap Screw
21. Lock Nut
22. Cap Screw
23. Spacer
24. Axle
25. Mounting Block
26. Pivot
27. Spacer
28. Spacer
29. Axle
30. Support
31. Washer
32. Slide Block
33. Washer
34. Washer
35. Spacer
36. Axle
37. Grease Fitting
38. Idler Wheel
39. Cap Screw
40. Cap Screw
41. Washer
42. Axle
43. Cap

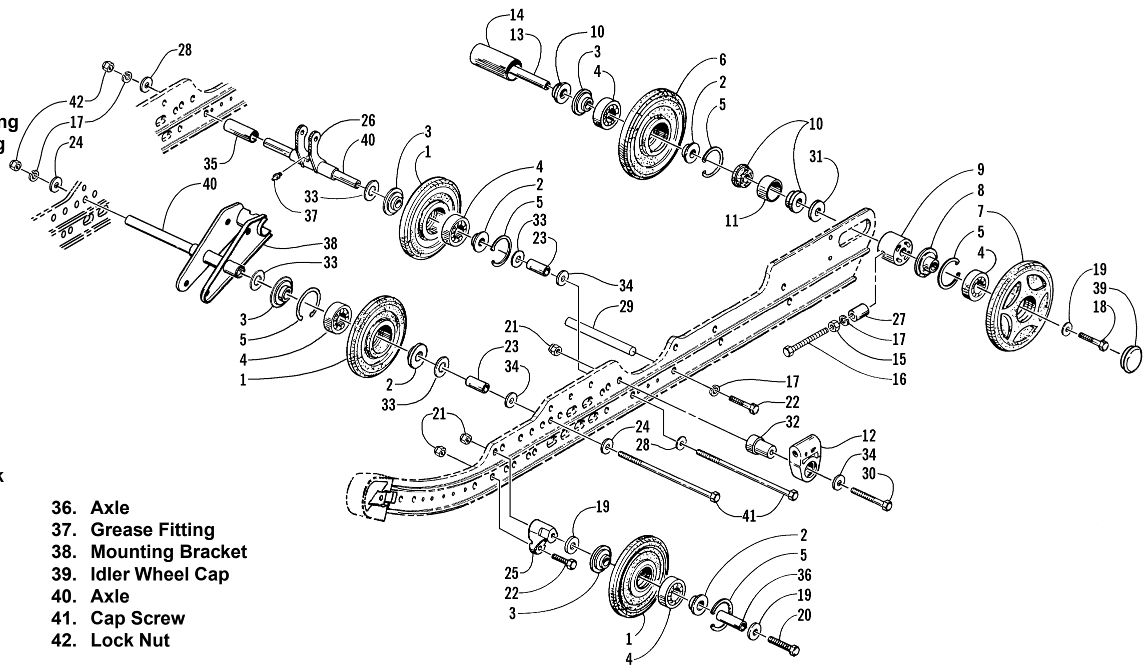


0734-377

Fig. 9-54

Style J

KEY
1. Idler Wheel
2. Wheel Insert
3. Wheel Insert
4. Bearing
5. Retaining Ring
6. Idler Wheel
7. Idler Wheel
8. Wheel Insert
9. Adjuster Bushing
10. Spacer Bushing
11. Spacer
12. Spring Slide
13. Axle
14. Spacer
15. Nut
16. Cap Screw
17. Lock Washer
18. Cap Screw
19. Washer
20. Cap Screw
21. Lock Nut
22. Cap Screw
23. Spacer
24. Lock Nut
25. Mounting Block
26. Pivot
27. Spacer
28. Washer
29. Axle
30. Cap Screw
31. Washer
32. Slide Block
33. Washer
34. Washer
35. Spacer
36. Axle
37. Grease Fitting
38. Mounting Bracket
39. Idler Wheel Cap
40. Axle
41. Cap Screw
42. Lock Nut

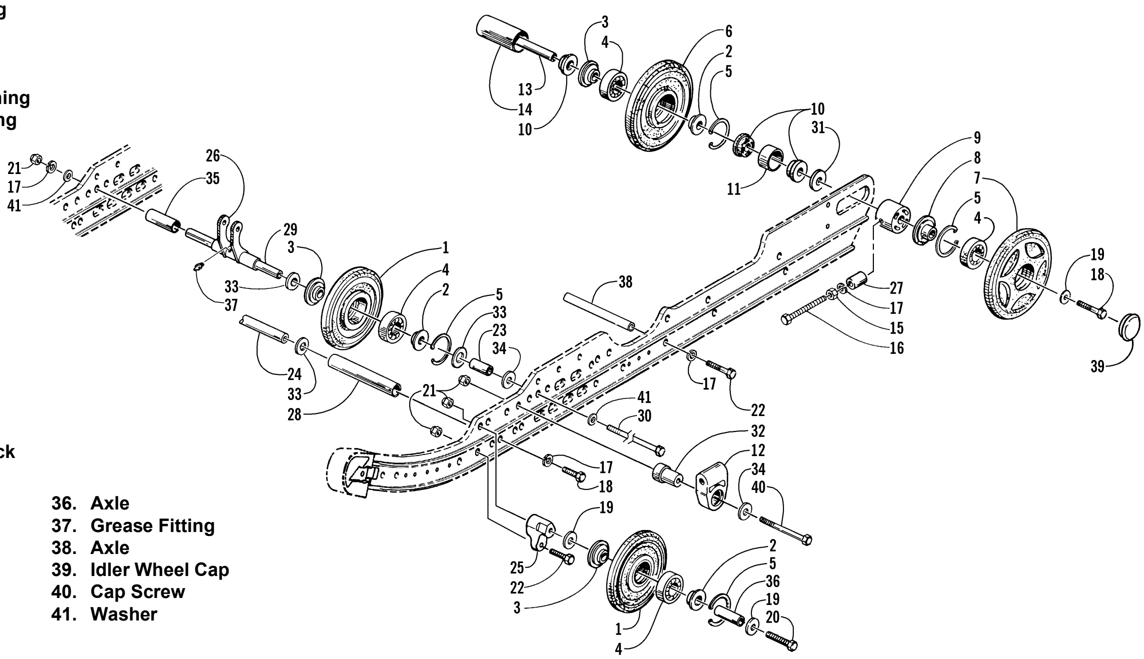


0735-212

Fig. 9-55

Style K

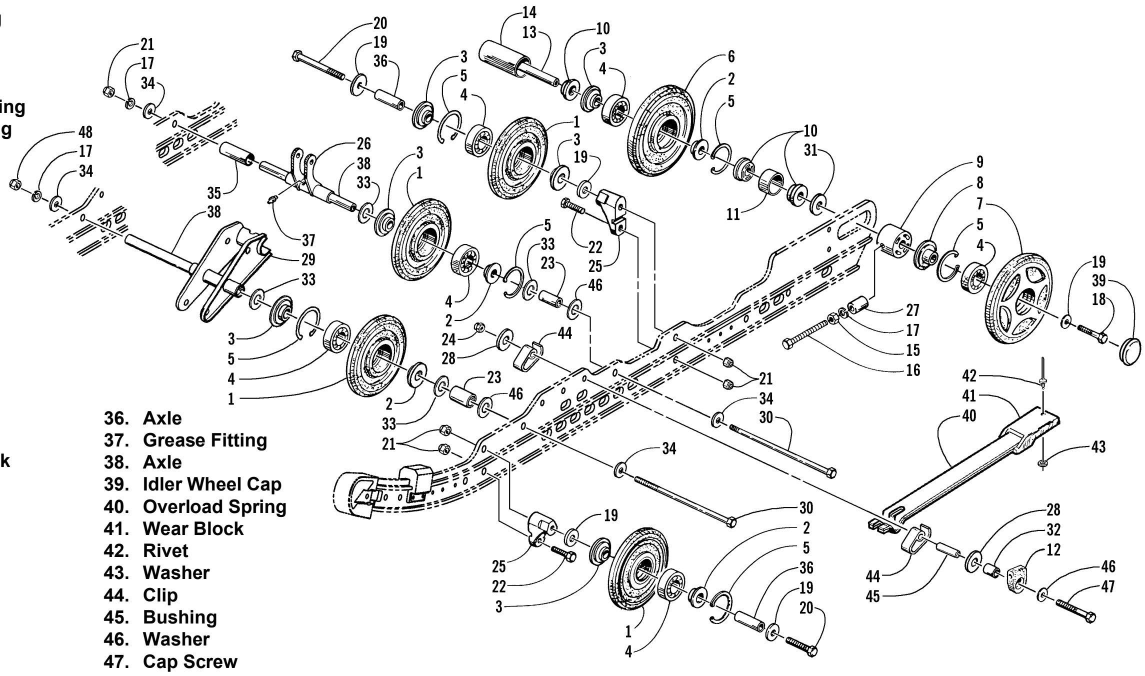
KEY
1. Idler Wheel
2. Wheel Insert
3. Wheel Insert
4. Bearing
5. Retaining Ring
6. Idler Wheel
7. Idler Wheel
8. Wheel Insert
9. Adjuster Bushing
10. Spacer Bushing
11. Spacer
12. Spring Slide
13. Axle
14. Spacer
15. Nut
16. Cap Screw
17. Lock Washer
18. Cap Screw
19. Washer
20. Cap Screw
21. Lock Nut
22. Cap Screw
23. Spacer
24. Axle
25. Mounting Block
26. Pivot
27. Spacer
28. Spacer
29. Axle
30. Cap Screw
31. Washer
32. Slide Block
33. Washer
34. Washer
35. Spacer
36. Axle
37. Grease Fitting
38. Axle
39. Idler Wheel Cap
40. Cap Screw
41. Washer



0735-246

9

Fig. 9-56

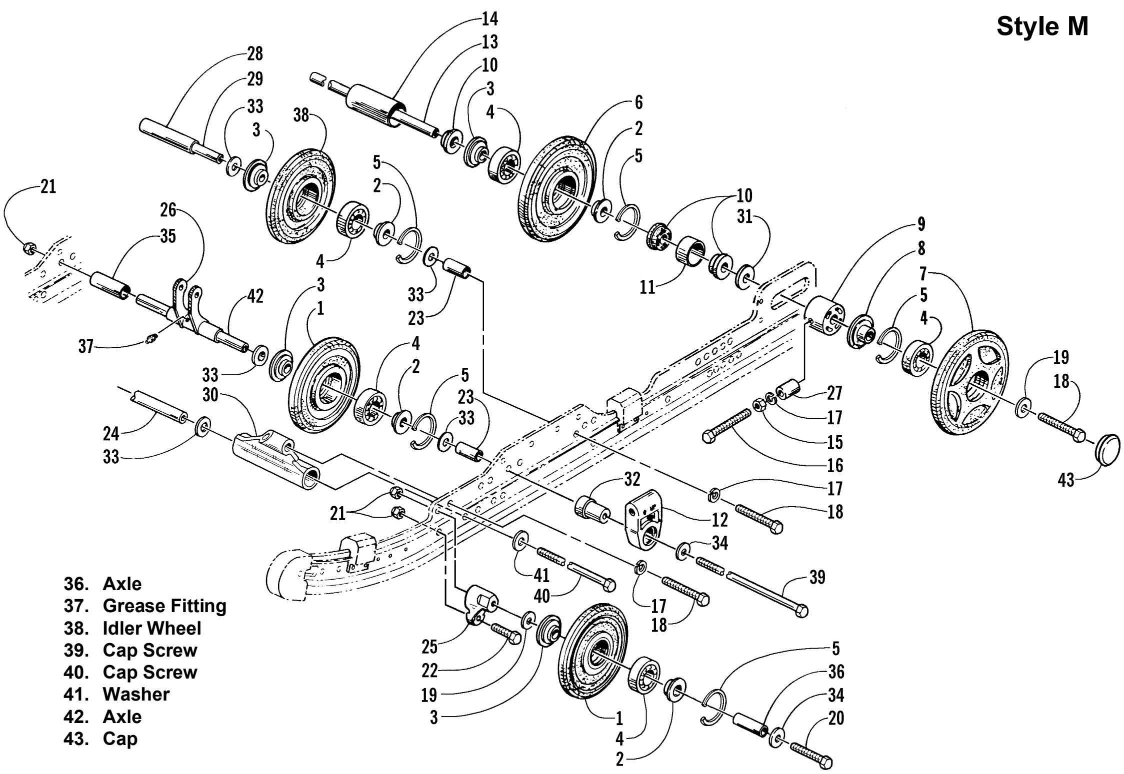


KEY

1. Idler Wheel
2. Wheel Insert
3. Wheel Insert
4. Bearing
5. Retaining Ring
6. Idler Wheel
7. Idler Wheel
8. Wheel Insert
9. Adjuster Bushing
10. Spacer Bushing
11. Spacer
12. Spring Slide
13. Axle
14. Spacer
15. Nut
16. Cap Screw
17. Lock Washer
18. Cap Screw
19. Washer
20. Cap Screw
21. Lock Nut
22. Cap Screw
23. Spacer
24. Lock Nut
25. Mounting Block
26. Pivot
27. Spacer
28. Washer
29. Bracket
30. Cap Screw
31. Washer
32. Spacer
33. Washer
34. Washer
35. Spacer
36. Axle
37. Grease Fitting
38. Axle
39. Idler Wheel Cap
40. Overload Spring
41. Wear Block
42. Rivet
43. Washer
44. Clip
45. Bushing
46. Washer
47. Cap Screw
48. Lock Nut

0735-150

Fig. 9-57



KEY

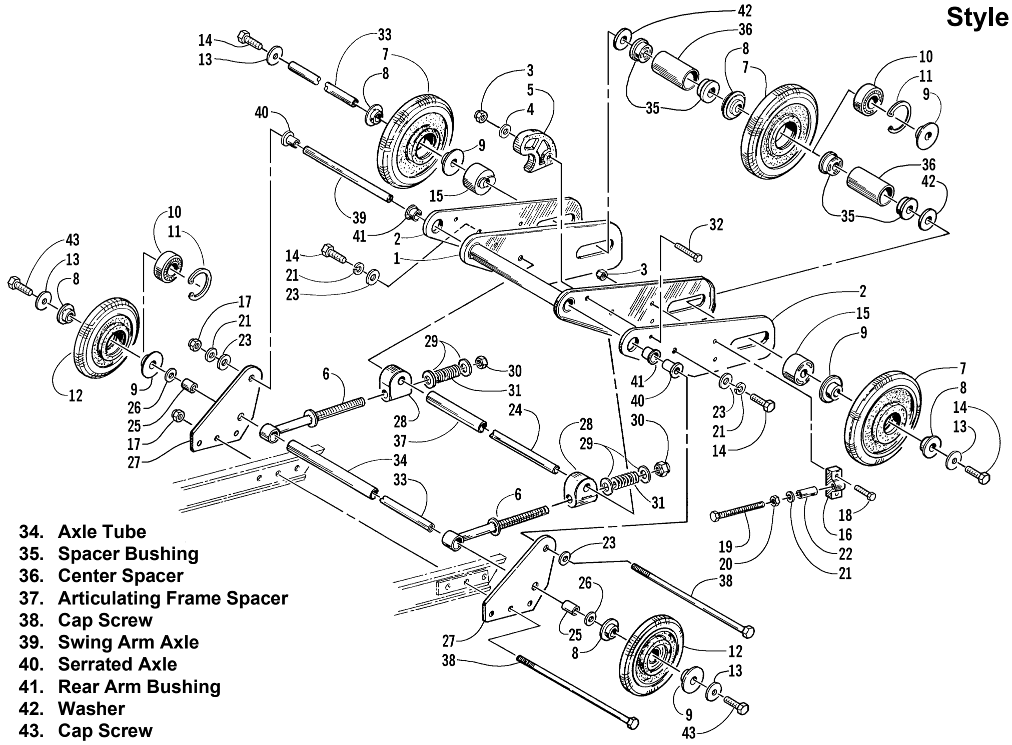
1. Idler Wheel
2. Wheel Insert
3. Wheel Insert
4. Bearing
5. Retaining Ring
6. Idler Wheel
7. Idler Wheel
8. Wheel Insert
9. Adjuster Bushing
10. Spacer Bushing
11. Spacer
12. Spring Slide
13. Axle
14. Spacer
15. Nut
16. Cap Screw
17. Lock Washer
18. Cap Screw
19. Washer
20. Cap Screw
21. Lock Nut
22. Cap Screw
23. Spacer
24. Axle
25. Mounting Block
26. Pivot
27. Spacer
28. Spacer
29. Axle
30. Support
31. Washer
32. Slide Block
33. Washer
34. Washer
35. Spacer
36. Axle
37. Grease Fitting
38. Idler Wheel
39. Cap Screw
40. Cap Screw
41. Washer
42. Axle
43. Cap

0735-192

Articulating Skid Frame Schematics

Fig. 9-58

Style A



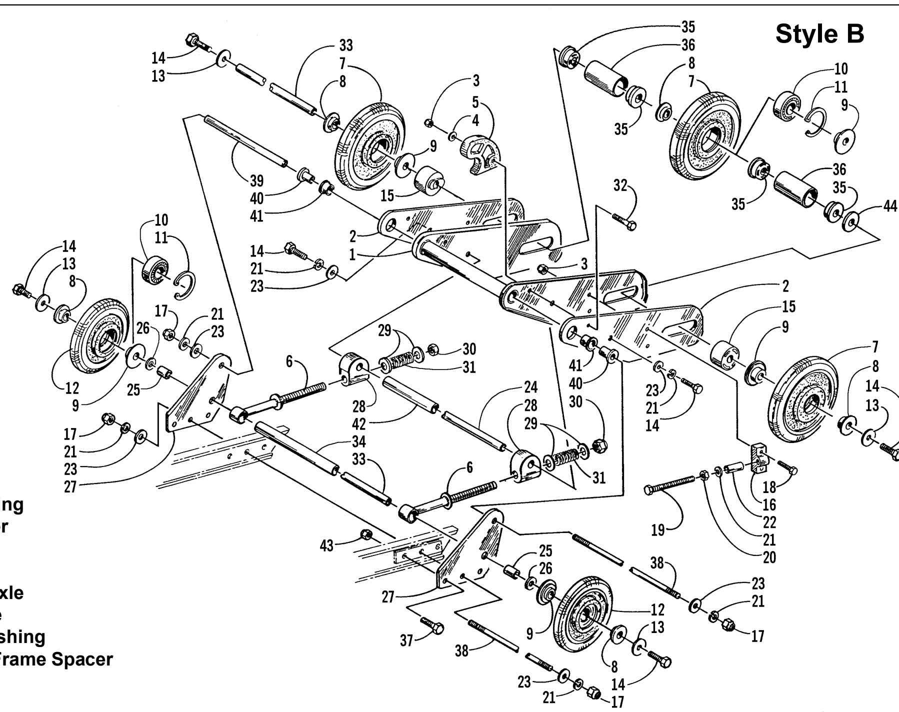
KEY

1. Swing Arm
2. Mounting Bracket
3. Lock Nut
4. Washer
5. Track Guide Bumper
6. Spring Bracket
7. Idler Wheel
8. Wheel Insert
9. Wheel Insert
10. Bearing
11. Retaining Ring
12. Idler Wheel
13. Washer
14. Cap Screw
15. Adjuster Bushing
16. Track Adjuster
17. Lock Nut
18. Cap Screw
19. Cap Screw
20. Nut
21. Lock Washer
22. Track Adjuster Spacer
23. Washer
24. Axle
25. Outer Axle
26. Washer
27. Mounting Bracket
28. Slide Block
29. Washer
30. Lock Nut
31. Spring
32. Cap Screw
33. Rear Wheel Axle
34. Axle Tube
35. Spacer Bushing
36. Center Spacer
37. Articulating Frame Spacer
38. Cap Screw
39. Swing Arm Axle
40. Serrated Axle
41. Rear Arm Bushing
42. Washer
43. Cap Screw

0734-927

Fig. 9-59

Style B



KEY

1. Swing Arm
2. Mounting Bracket
3. Lock Nut
4. Washer
5. Track Guide Bumper
6. Spring Bracket
7. Idler Wheel
8. Wheel Insert
9. Wheel Insert
10. Bearing
11. Retaining Ring
12. Idler Wheel
13. Washer
14. Cap Screw
15. Adjuster Bushing
16. Track Adjuster
17. Lock Nut
18. Cap Screw
19. Cap Screw
20. Nut
21. Lock Washer
22. Track Adjuster Spacer
23. Washer
24. Slide Block Axle
25. Outer Axle
26. Washer
27. Mounting Bracket
28. Slide Block
29. Washer
30. Lock Nut
31. Spring
32. Cap Screw
33. Rear Axle
34. Axle Tube
35. Spacer Bushing
36. Center Spacer
37. Cap Screw
38. Stud Bolt
39. Swing Arm Axle
40. Serrated Axle
41. Rear Arm Bushing
42. Articulating Frame Spacer
43. Lock Nut
44. Washer

0734-939

9

Repair Procedure 1 - Track/Rear Suspension

This Track/Rear Suspension sub-section (Repair Procedure 1) has been organized so each procedure can be completed individually and efficiently. Each sub-section has (as necessary) Removing, Disassembling, Cleaning and Inspecting, Assembling, and Installing procedures.

■ **NOTE: Some photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.**

Removing Skid Frame

■ **NOTE: Many service procedures can be performed without removing the skid frame. Closely observe the note introducing each sub-section for this important information.**

1. On models with remote adjuster, rotate the remote reservoir adjuster knob counterclockwise to reduce pressure on the skid frame front shock absorber.

2. On models with the remote adjuster, disconnect the quick-adjuster located under the driven pulley; then route the hose out of tunnel and out of the holding bracket on the inside of the tunnel.

> **⚠ CAUTION**
>
> **If this is not done, damage to the hose may result.**

3. Loosen the jam nuts and two track-tension adjusting bolts.

Fig. 9-60



AG670D

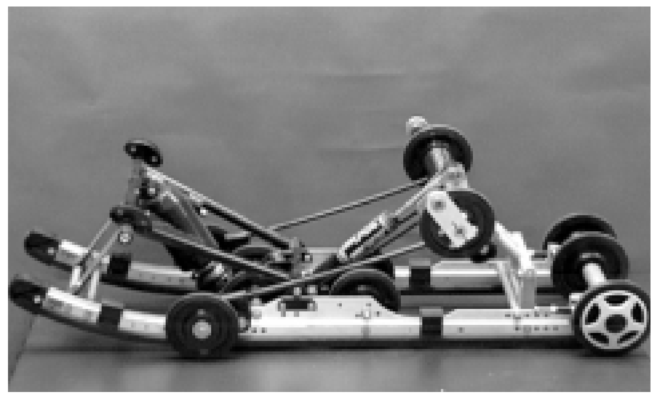
4. Place a support stand under the rear bumper; then while holding the flared bushing, remove the rear cap screws securing the skid frame to the tunnel. Account for lock washers and flat washers.

■ **NOTE: The support stand should hold the snowmobile level but not raised off the floor.**

5. Remove the front cap screws securing the skid frame to the tunnel. Account for a flat washer and a lock washer.

6. Remove the support stand; then tip the snowmobile onto one side using a piece of cardboard to protect against scratching. Remove the skid frame.

Fig. 9-61



AG671D

Wear Strips

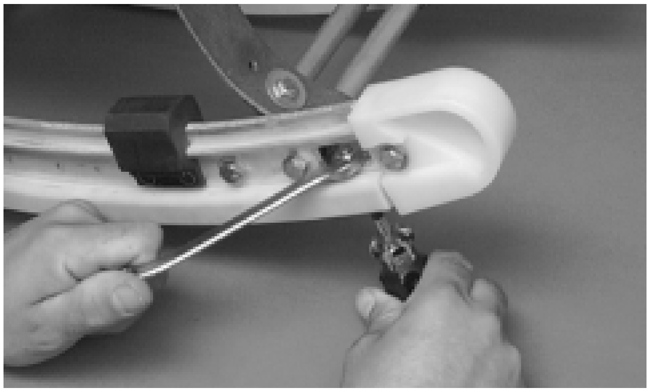
REMOVING

■ **NOTE: It is possible to remove and install a wear strip without removing the skid frame. To do this, remove the machine screw and lock nut securing the wear strip at the front of the slide rail; then align the wear strip with openings (windows) in the track and drive it rearward off the slide rail. Apply low-temperature grease to the new wear strip and slide rail; then align the wear strip with openings (windows) in the track and drive it forward onto the slide rail. Secure with the machine screw and lock nut.**

■ **NOTE: The skid frame should be removed for this procedure (see Removing Skid Frame in this sub-section).**

1. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail.

Fig. 9-62

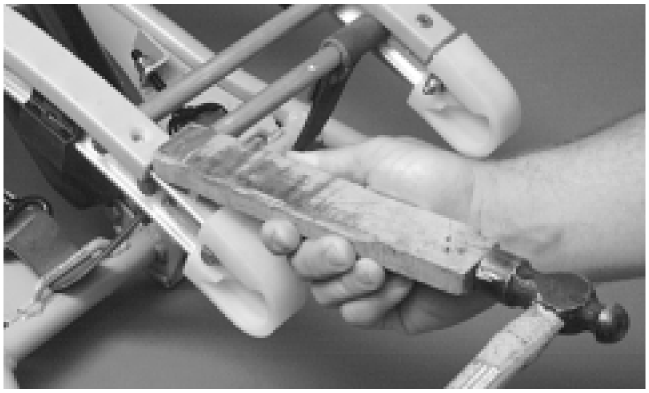


AG504D

2. Using a pipe wrench and starting from either end, hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.

■ NOTE: The wear strip can also be driven off the slide rail; however, it is quicker to use a pipe wrench.

Fig. 9-63



AG505D

CLEANING AND INSPECTING

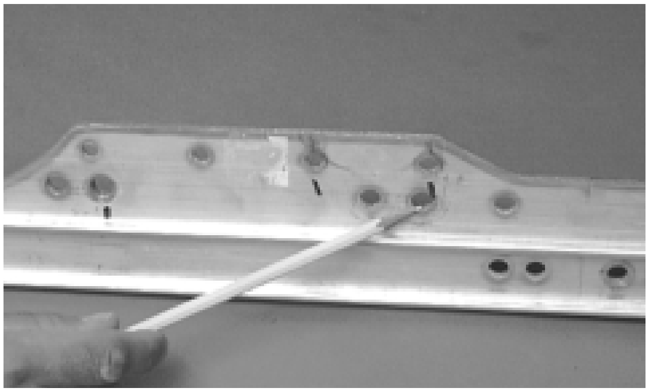
■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the slide rail using parts-cleaning solvent and compressed air.

⚠ WARNING
Always wear an approved pair of safety glasses when using compressed air.

2. Inspect the slide rail for cracks. If any cracks are found, replace the slide rail.

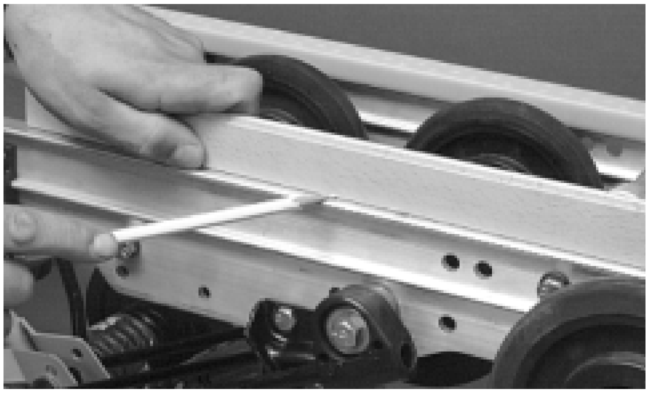
Fig. 9-64



AG529D

3. Using a straightedge, inspect the slide rail for any unusual bends. Place the straightedge along the bottom surface of the slide rail. If the rail is found to be bent, it must be replaced.

Fig. 9-65

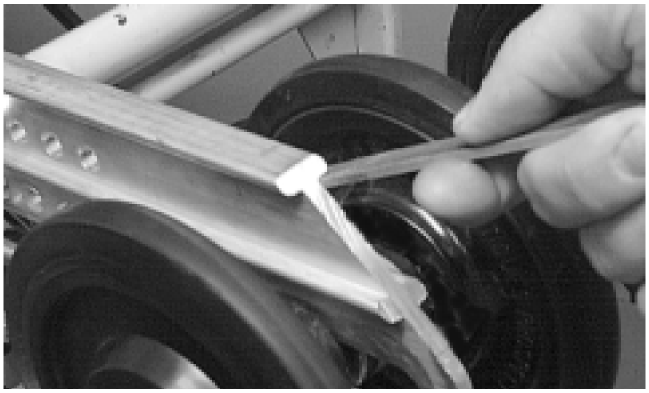


AG536D

INSTALLING

■ NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.

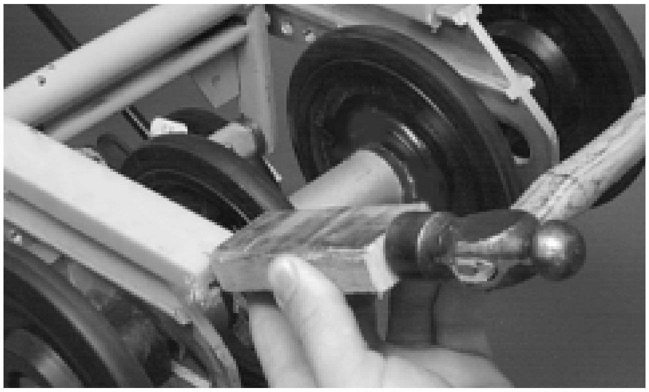
Fig. 9-66



AG534D

1. From the back, start the wear strip onto the rail; then using a block of wood and a hammer, drive the wear strip forward into position.

Fig. 9-67



AG535D

2. Secure with a machine screw and lock nut. Tighten to 1.1 kg-m (8 ft-lb).

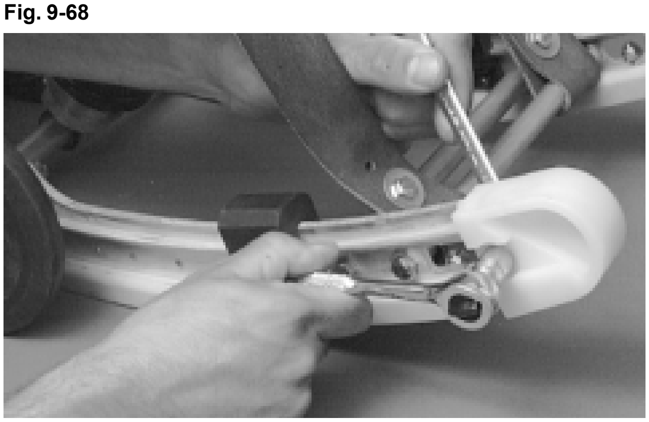
End Caps

■NOTE: The skid frame does not have to be removed for this procedure.

REMOVING

1. Remove the lock nut, washers, and cap screw securing the end cap.

Fig. 9-68



AG506D

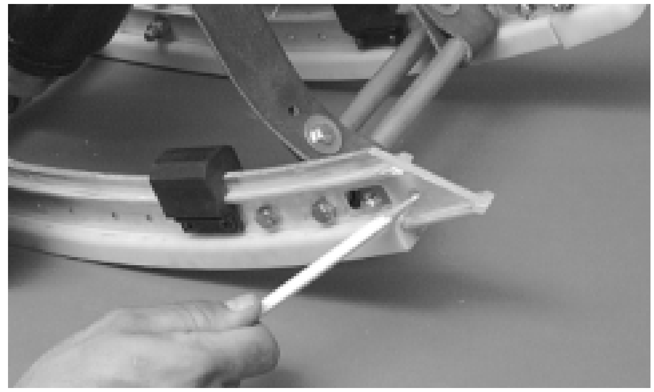
2. Using a hammer, tap the end cap off the rail.

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the end cap area of the slide rail for cracks and wear.

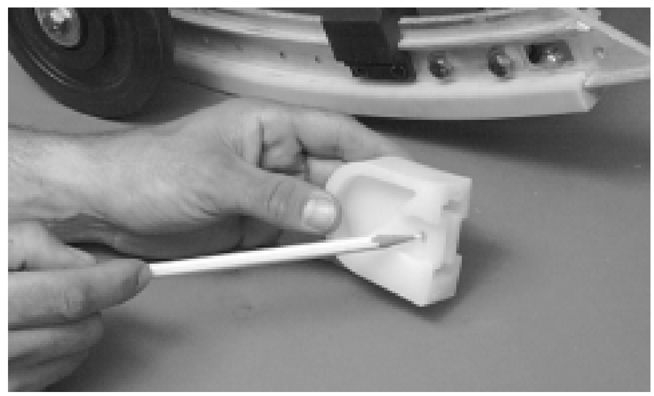
Fig. 9-69



AG507D

2. Inspect the end cap for any signs of cracking or wear.

Fig. 9-70



AG508D

3. Clean both the slide rail area and the end cap. Using compressed air, clean the areas of dirt and gravel.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

4. Inspect the cap screw for cracked, stretched, or damaged threads. Use a new lock nut when assembling.

INSTALLING

1. Position the end cap on the slide rail; then align the hole in the end cap with the hole in the slide rail.

2. Secure with a cap screw, washers, and lock nut. Tighten to 1.1 kg-m (8 ft-lb).

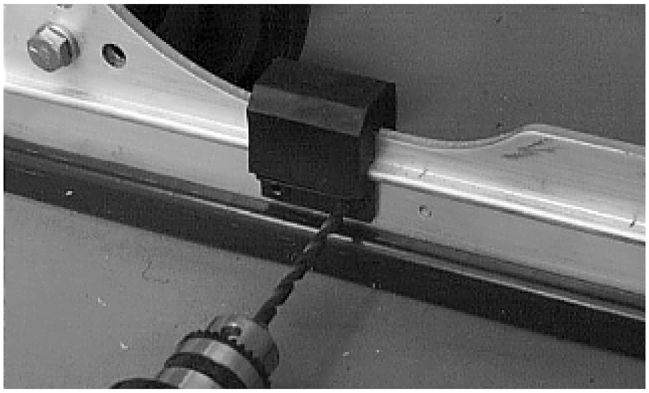
Shock Pads

■ **NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

1. Using a 3/16-in. drill bit drill out the rivets securing the shock pad to the slide rail. Account for the retaining brackets.

Fig. 9-71



AG476D

2. Remove the shock pad.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the pad and retaining brackets for damage or wear.

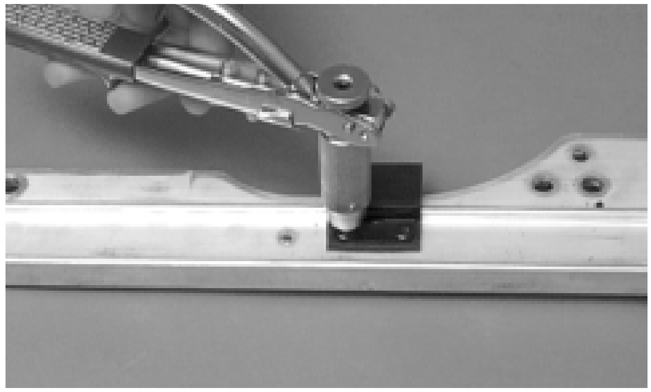
2. Inspect the rivet holes in the slide rail for damage or elongation.

INSTALLING

1. Place the pad and retaining brackets into position on the slide rail.

2. Secure the pad assembly with rivets.

Fig. 9-72



AG531D

Front Outer Idler Wheels

■ **NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

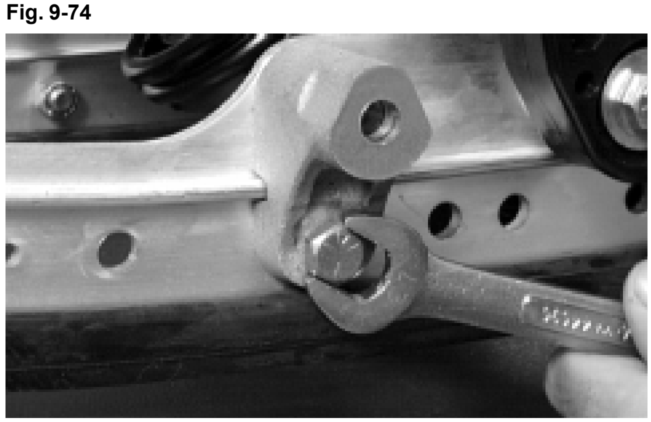
1. Remove the cap screws and lock nuts securing the front outer idler wheel and the idler wheel mounting block. Account for flat washers and an axle.

Fig. 9-73



AG678D

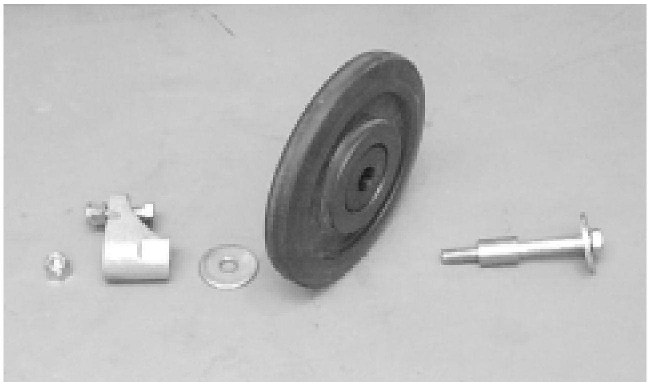
Fig. 9-74



AG686D

2. Note the locations of the flat washers for assembly purposes. The washers are to be installed next to the idler wheels.

Fig. 9-75



AG622D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and each plastic hub for cracks or damage.
3. Rotate the idler wheel bearing (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

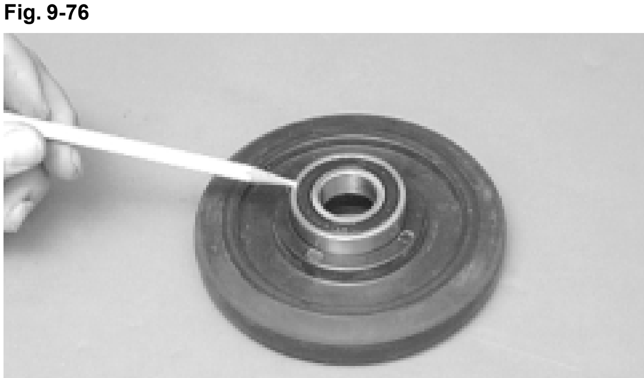
⚠ CAUTION
Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

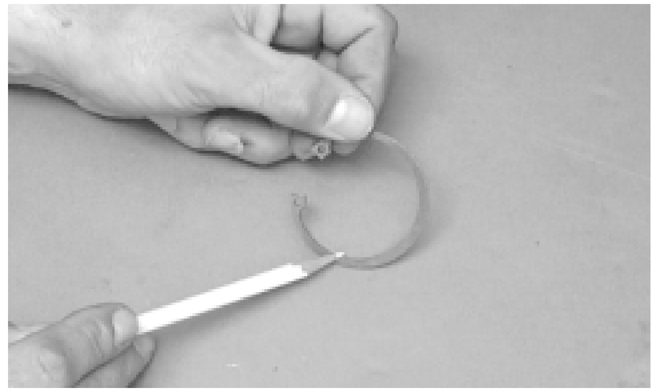
Fig. 9-76



AG538D

D. Install the snap ring making sure the "sharp side" is directed away from the bearing.

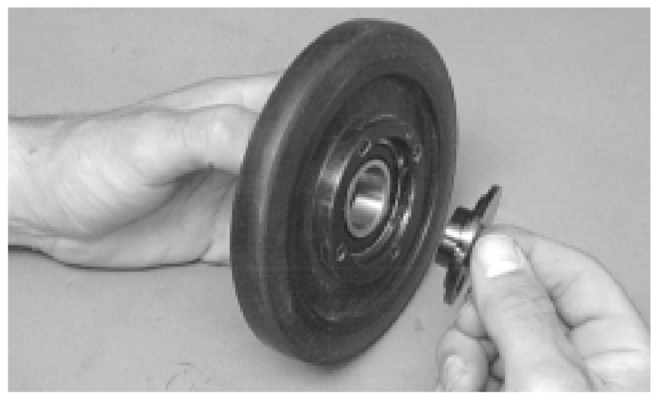
Fig. 9-77



AG539D

E. Install the insert.

Fig. 9-78

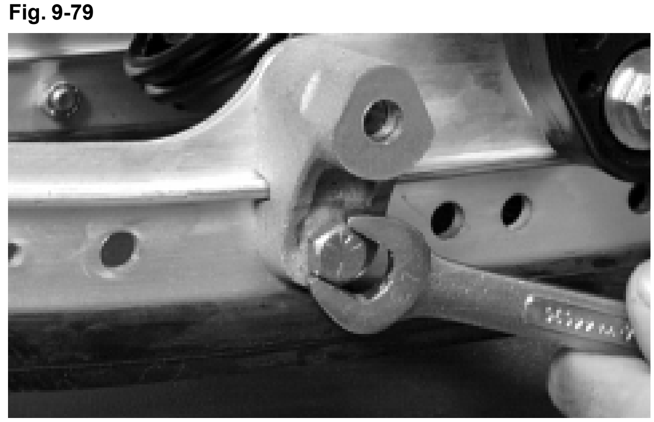


AG540D

INSTALLING

1. Secure the mounting block on the slide rail with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

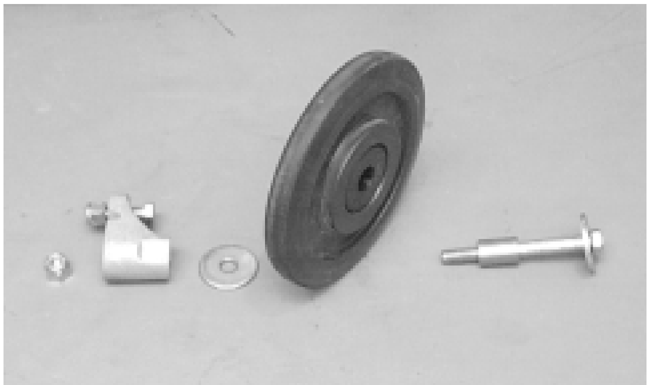
Fig. 9-79



AG686D

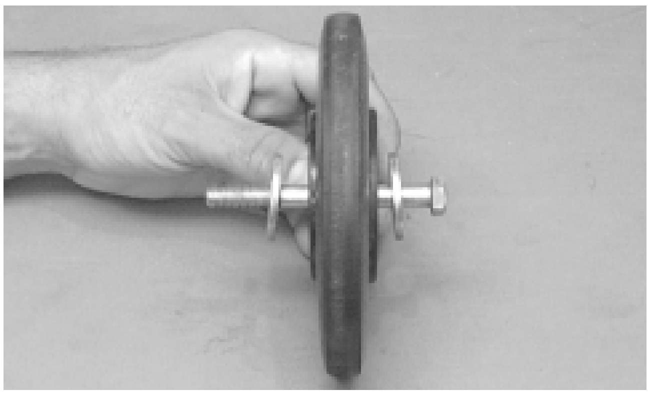
2. Place the idler wheel and axle against the mounting block making sure there is a flat washer on both sides of the idler wheel.

Fig. 9-80



AG622D

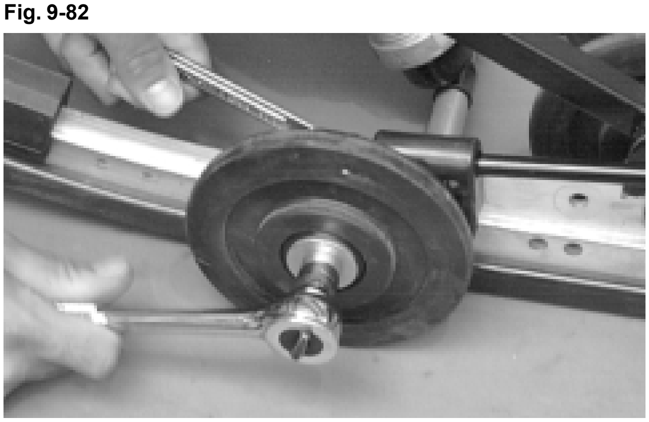
Fig. 9-81



AG623D

3. Secure the idler wheel assembly with a cap screw and a lock nut. Tighten cap screws to 3.2 kg-m (23 ft-lb).

Fig. 9-82



AG618D

Rear Inner Idler Wheels

■ **NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

1. Remove the cap screws and lock washers securing the idler wheel axle shaft to the slide rails.

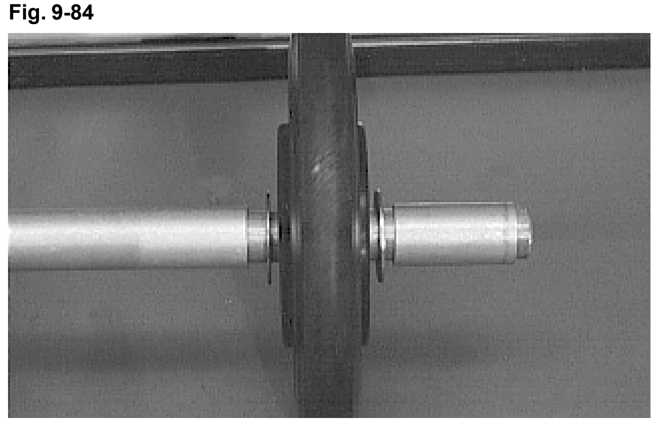
Fig. 9-83



AG592D

2. Slide the rear idler wheel assembly rearward and lift the idler wheel assembly from the suspension. Account for one long spacer, two short spacers, and four flat washers.

Fig. 9-84



AG459D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.

2. Inspect each idler wheel and plastic hub for cracks or damage.

3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.

4. If a bearing must be replaced, use this procedure.

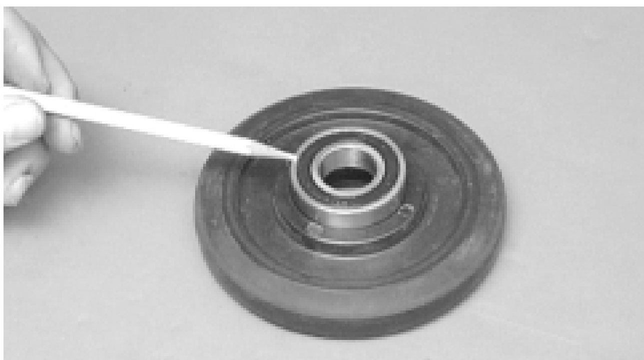
⚠ CAUTION
Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

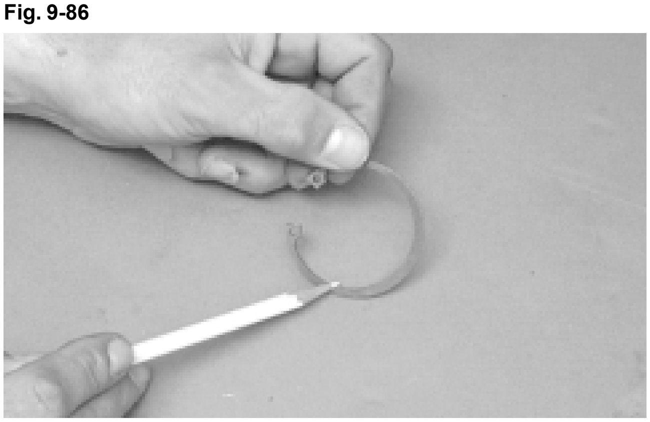
Fig. 9-85



AG538D

D. Install the snap ring making sure the "sharp side" is directed away from the bearing.

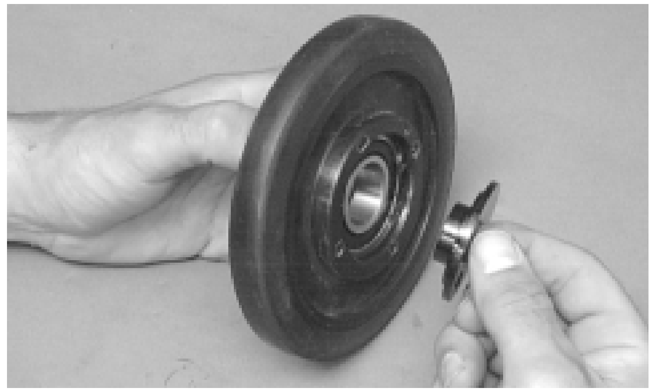
Fig. 9-86



AG539D

E. Install the insert.

Fig. 9-87

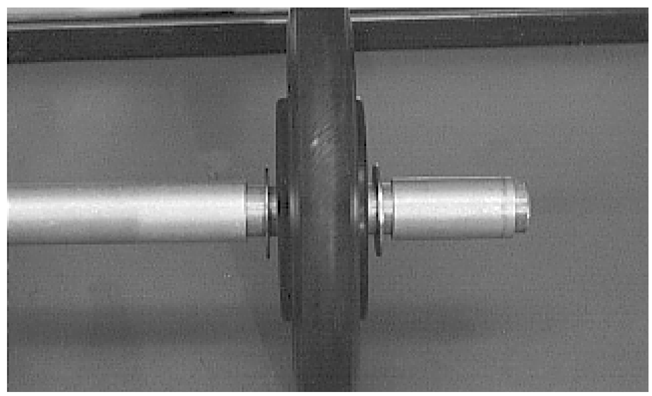


AG540D

INSTALLING

1. Position the idler wheels with spacer and spacer washers (one on each side of idler wheel) on the axle.

Fig. 9-88



AG459D

2. Slide the inner wheel assembly into position between the rails. Secure the axle with two cap screws and lock washers (coated with red Loctite #271). Tighten to 3.2 kg-m (23 ft-lb).

■ **NOTE: To prevent possible damage to the skid frame, make sure to install the idler wheels in their proper mounting locations.**

Fig. 9-89



AG592D

Rear Upper Idler Wheels/Rear Springs

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

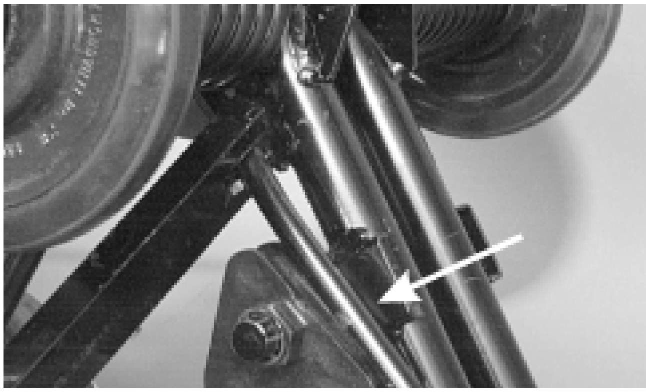
REMOVING

1. Using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

⚠ WARNING

Care must be taken when removing the spring or damage or injury could result.

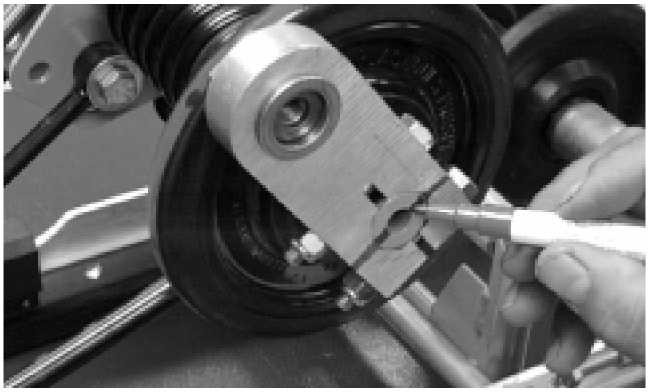
Fig. 9-90



AG624DA

2. Mark the offset pivot idler and the idler arm for assembly purposes.

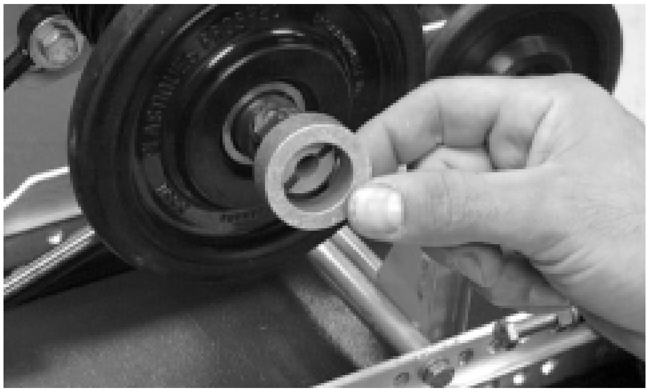
Fig. 9-91



AG675D

3. Remove the cap screws securing the offset pivot idler arm assembly to the idler arm; then remove the offset pivot arm idler assembly. Account for a flanged axle, flared bushing, idler spacer collar, and lock nuts.

Fig. 9-92

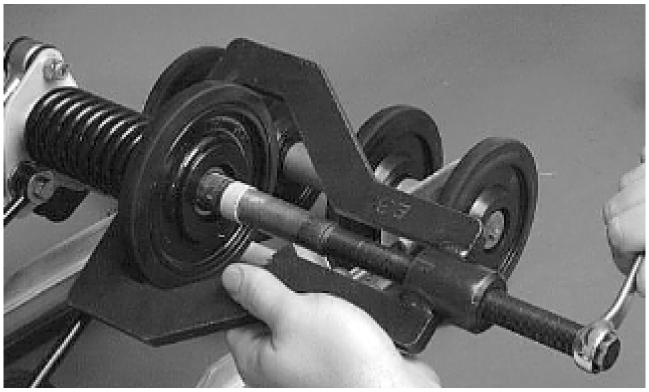


AG677D

4. Remove the idler wheel.

■ **NOTE: It may be necessary to use the Idler Wheel Puller Kit (p/n 0644-122) to remove the wheel.**

Fig. 9-93



AG461D

5. Remove the cap screw and flat washer securing the spring slide to the rail. Account for a slide block and washer.

Fig. 9-94



AG593D

6. Remove the spring and sleeve from the idler arm.

9

Fig. 9-95



AG681D

■ **NOTE: Use the same procedure for the other side.**

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and plastic hub for cracks or damage.
3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

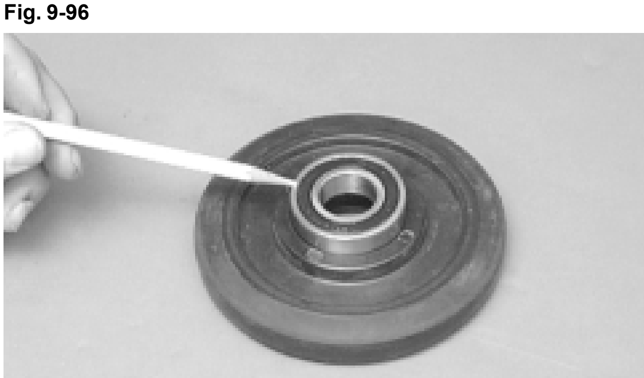
> ⚠ **CAUTION**
>
> **Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.**

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

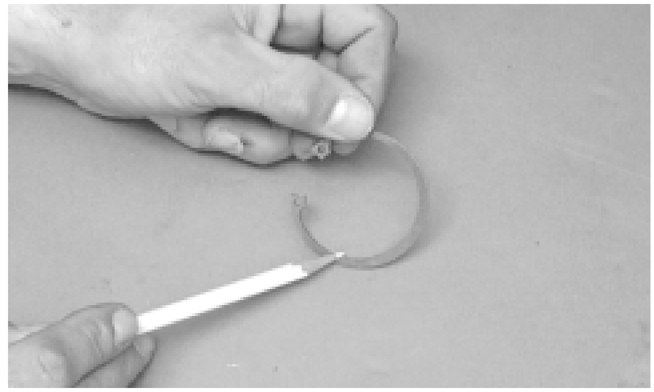
Fig. 9-96



AG538D

D. Install the snap ring making sure the "sharp side" is directed away from the bearing.

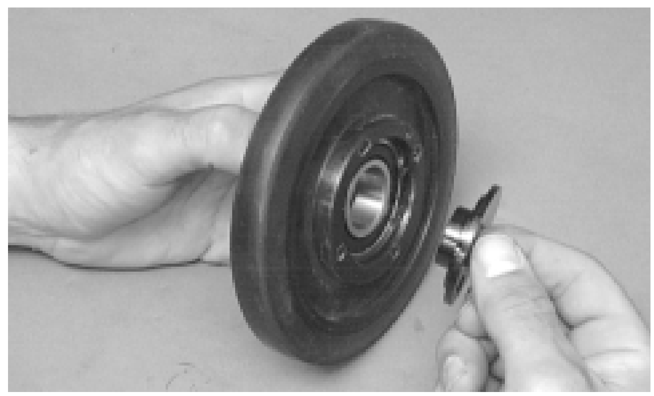
Fig. 9-97



AG539D

E. Install the insert.

Fig. 9-98



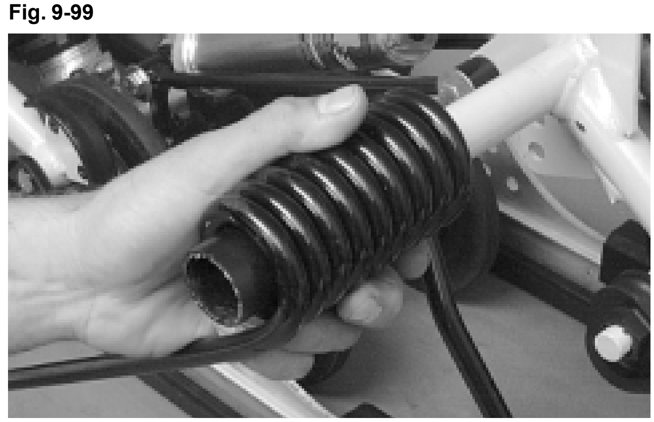
AG540D

5. Inspect the spring, spring slide, sleeve, washers, slide block insert, and shaft area for wear.
6. Inspect the adjusting cams and arms for cracks.

INSTALLING

1. Slide the sleeve and spring onto the idler arm.

Fig. 9-99



AG655D

2. Place the spring slide and slide block (with spring in slide block) into position on the slide rail. Secure with a cap screw (coated with red Loctite #271) and washer. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-100



AG680D

Fig. 9-101



AG593D

3. Install the rear upper idler wheel on the idler arm.

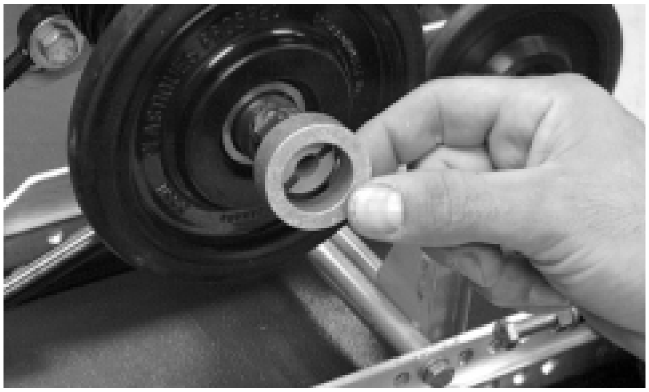
Fig. 9-102



AG545D

4. Install the idler spacer collar onto the idler arm.

Fig. 9-103



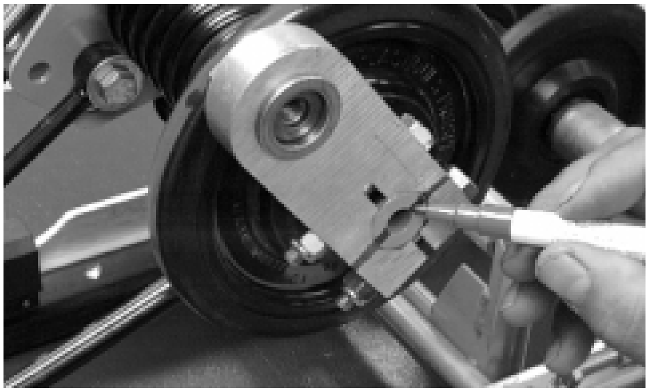
AG677D

5. Place the flanged axle with a thin flat washer through the notched side of the offset pivot idler arm assembly.

■ **NOTE: If the flanged axle in the offset pivot idler arm is loose, it must be cleaned and green Loctite #609 must be applied to it prior to installation.**

6. Align the marks on the idler arm to the centerline of the offset pivot idler arm assembly. Secure the offset pivot idler arm to the idler arm with cap screws and lock nuts. Tighten to 2.6 kg-m (19 ft-lb).

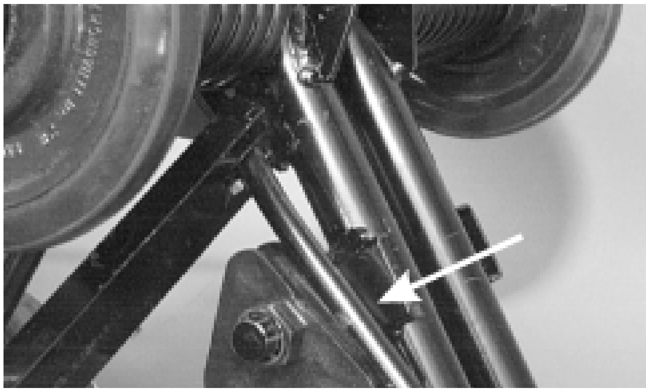
Fig. 9-104



AG675D

7. Place the short spring leg onto the adjusting cam using the rear suspension spring tool.

Fig. 9-105



AG624DA

9

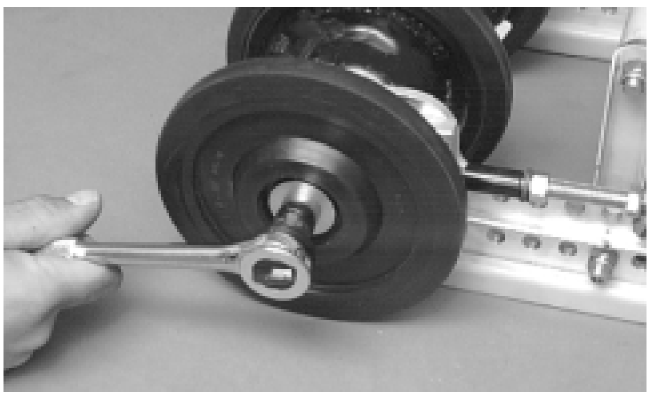
Rear Axle and Idler Wheels

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

1. Remove the cap screw and large flat washer securing the outer rear idler wheel. Remove the outer idler wheel from the shaft.

Fig. 9-106

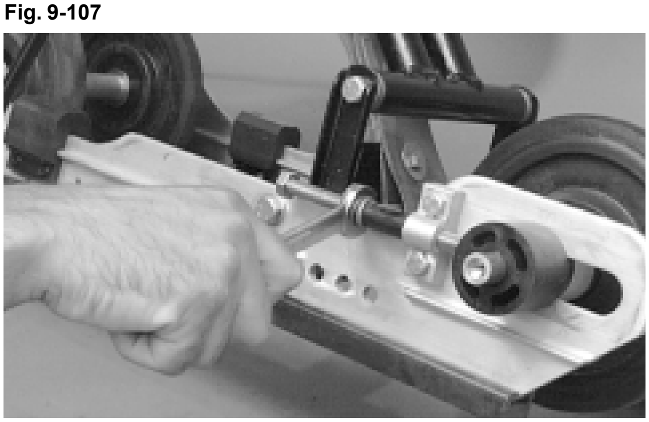


AG548D

■ **NOTE: The large flat side of the wheel insert is positioned next to the inner plastic adjuster bushing. The idler wheel must be installed with the wheel insert properly positioned.**

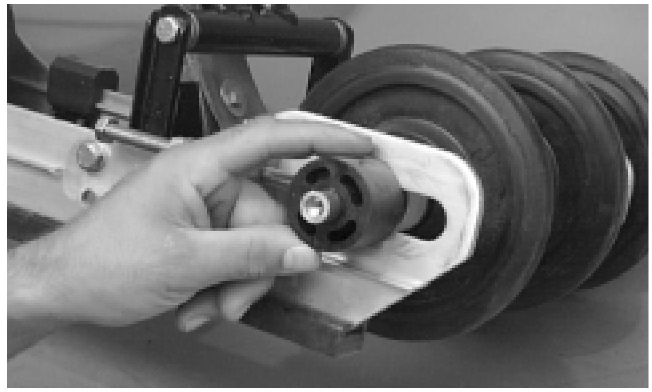
2. Loosen the track adjusting bolts. Slide the outer adjuster bushings off the axle.

Fig. 9-107



AG627D

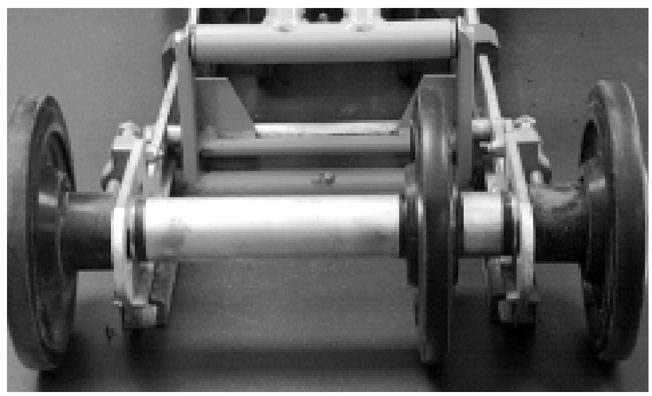
Fig. 9-108



AG628D

3. Carefully slide the shaft out from the inner idler wheels and note the position of the spacers and washers.

Fig. 9-109



AG805D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearings with a clean cloth.
2. Inspect all idler wheel inserts (inner and outer) for any cracks.
3. Inspect the outer rubber portion of the idler wheels for cracks and poor bonding.
4. Inspect the plastic insert of each idler wheel for cracks.
5. Inspect the shaft for wear and damaged threads.
6. Inspect all idler wheel bearings. Turn each bearing (by hand) and if any roughness or binding is noted, replace the bearing.
7. If a bearing must be replaced, use this procedure.

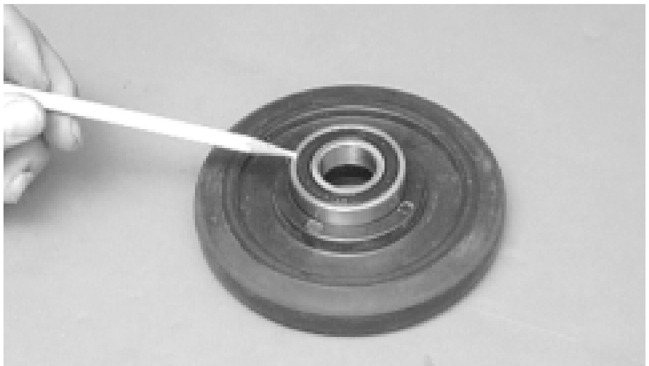
> ⚠ **CAUTION**
>
> **Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.**

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

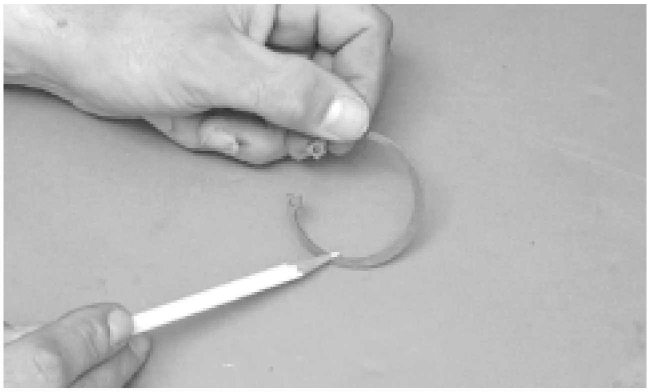
Fig. 9-110



AG538D

D. Install the snap ring making sure the "sharp side" is directed away from the bearing.

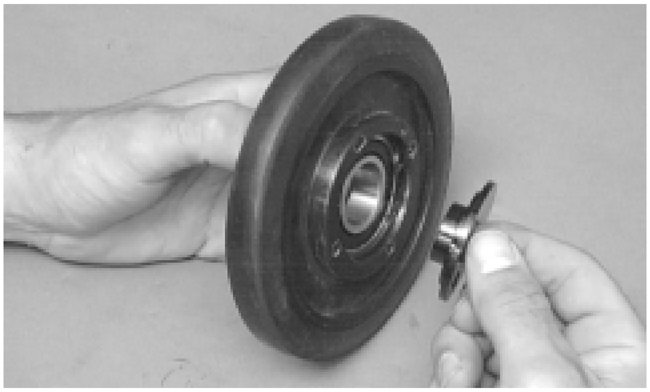
Fig. 9-111



AG539D

E. Install the insert.

Fig. 9-112

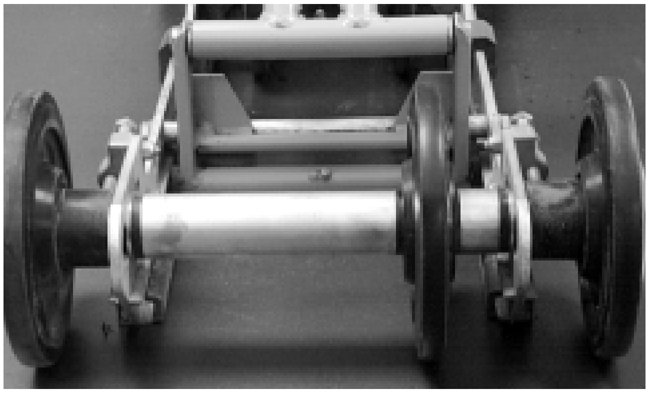


AG540D

ASSEMBLING

1. In order from the right-hand side, slide the axle through the slide rail axle bracket; then place a flat washer, short spacer with bushings, inner idler wheel with insert, long spacer with bushings, and flat washer on the axle. Slide the axle through the opposite slide rail axle bracket. Place the plastic adjuster bushings on the axle (on the outside of each axle bracket). Make sure the hole in the adjuster bushing is aligned directly with the adjusting bolt.

Fig. 9-113



AG805D

Fig. 9-114

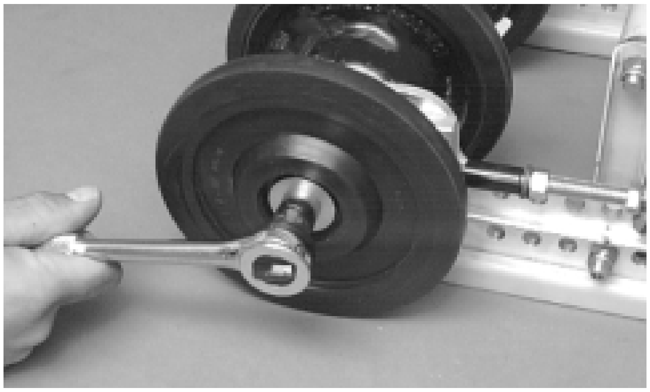


AG551D

2. Place the outer idler wheels on the axle (with the large flat of the insert directed inward) and secure with two cap screws (coated with red Loctite #271) and large flat washers. Tighten cap screws to 3.2 kg-m (23 ft-lb).

9

Fig. 9-115



AG548D

3. Adjust track alignment (see Track Alignment in this sub-section).

4. Adjust track tension deflection (see Track Tension in this sub-section).

Idler Arm

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

1. Remove the rear upper idler wheels and springs (see Rear Upper Idler Wheels/Rear Springs in this section).

Fig. 9-116



AG545D

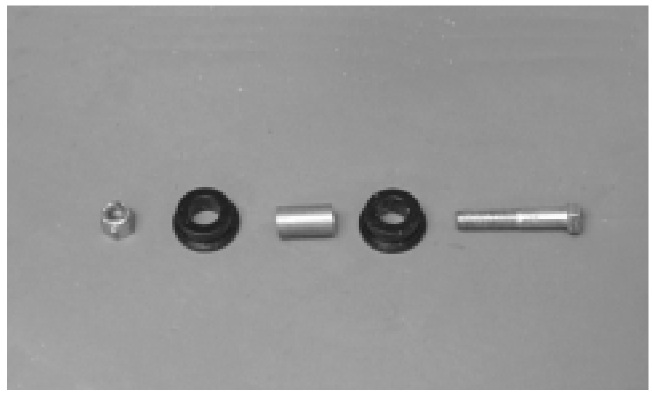
2. Remove the cap screw and lock nut securing the upper shock eyelet to the idler arm. Account for a spacer, lock nut, and bushings.

Fig. 9-117



AG467D

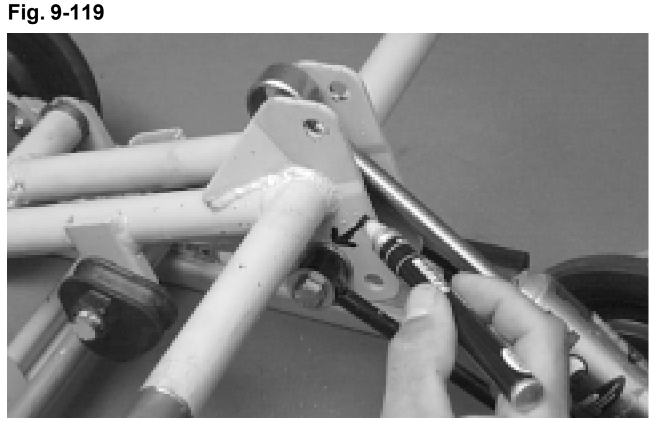
Fig. 9-118



AG553D

■ **NOTE: Mark the hole that the upper shock links are mounted in for assembly purposes.**

Fig. 9-119



AG554D

3. Remove the cap screw and lock nut securing the upper shock links to the idler arm. Account for a lock nut, spacer, flat washers, and axle links.

Fig. 9-120



AG682D

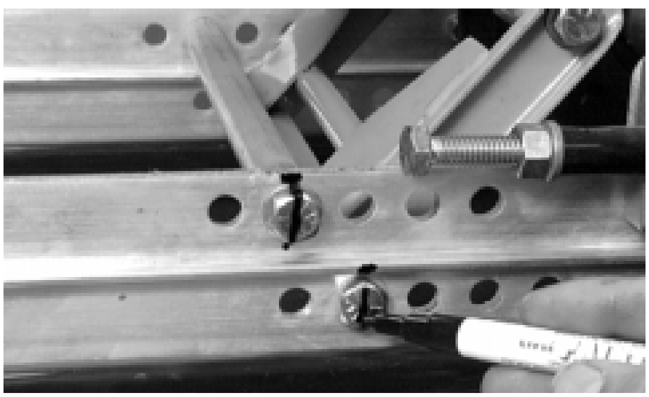
Fig. 9-121



AG556D

■ **NOTE: Note the mounting hole from which the rear arm was removed for assembly purposes.**

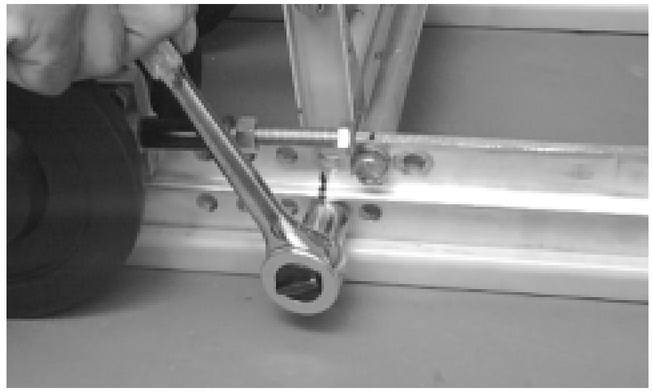
Fig. 9-122



AG683D

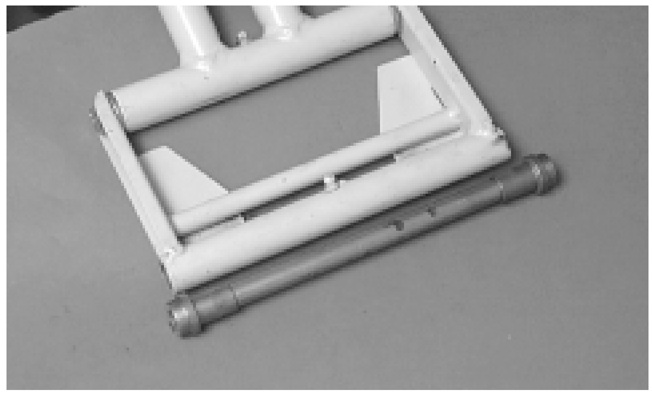
4. Remove the cap screw and lock nut securing the rear arm to the slide rail. Account for the serrated axles and axle tube.

Fig. 9-123



AG558D

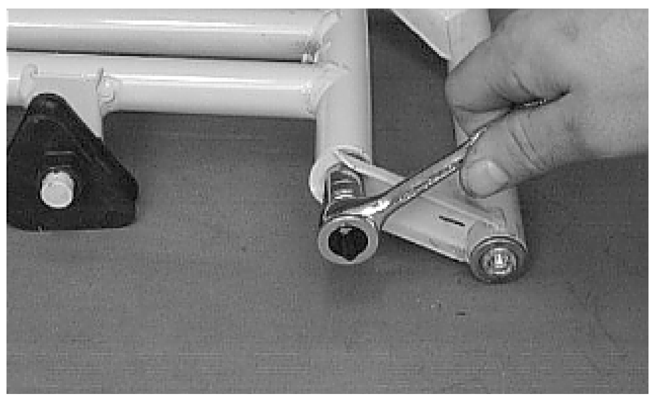
Fig. 9-124



AG560D

5. Remove the cap screw and lock nut securing the rear arm to the idler arm. Account for the aluminum axle and bushing assemblies.

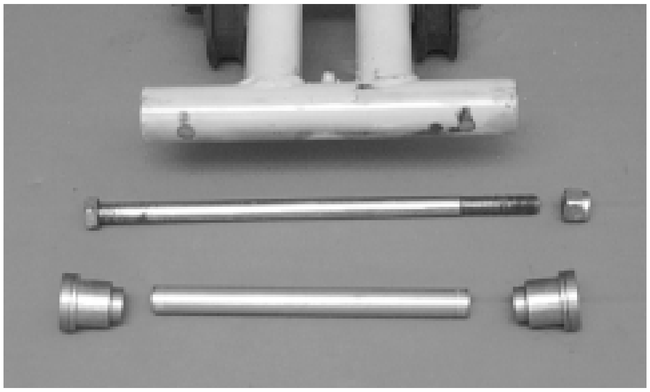
Fig. 9-125



AG477D

9

Fig. 9-126



AG561D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearings with a clean cloth.
2. Inspect each idler wheel for cracks or damage.
3. Inspect the bushings (located in the arm pivot area) for wear or damage.
4. Inspect all welds and the tubing of the upper arm for cracks or unusual bends.
5. Inspect the two adjusting cams for damage.
6. Rotate the idler wheel bearings (by hand) and check for binding or roughness.
7. If a bearing must be replaced, use this procedure.

⚠ CAUTION

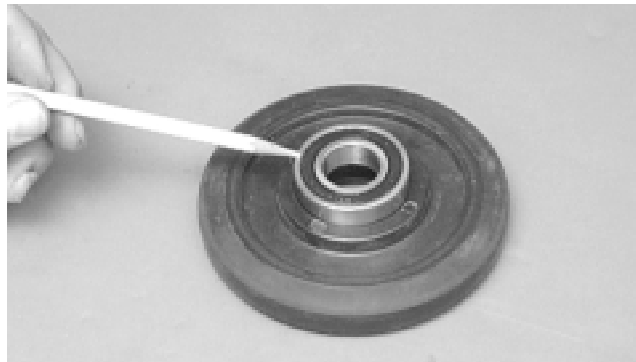
Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

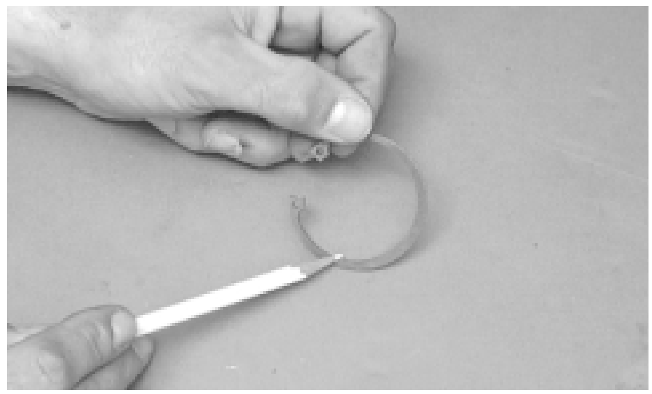
Fig. 9-127



AG538D

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.

Fig. 9-128



AG539D

E. Install the insert.

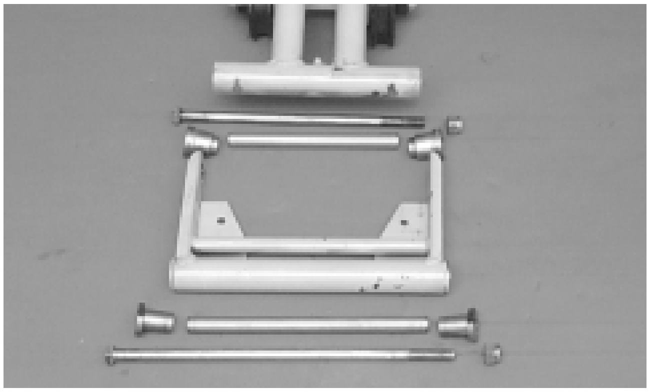
Fig. 9-129



AG540D

ASSEMBLING

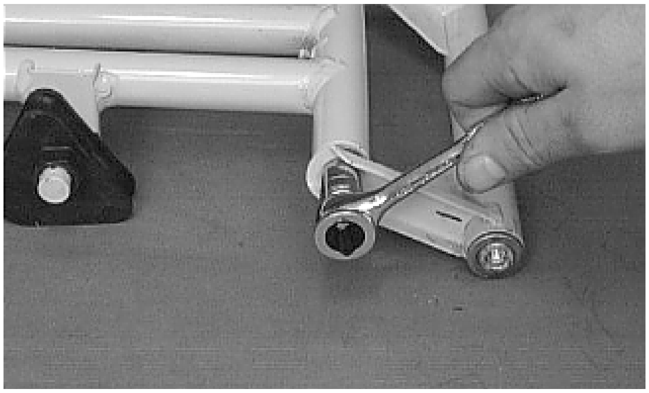
Fig. 9-130



AG562D

1. Install the rear arm onto the idler arm with an aluminum axle, bushing assemblies, cap screw, and a lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-131

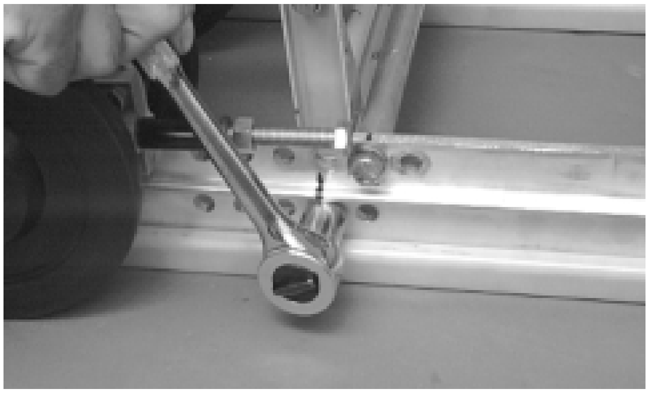


AG477D

■ **NOTE: Install the rear arm assembly into the appropriate mounting hole as noted during disassembly.**

2. Place the rear arm assembly into position (with the brace facing towards the front side) between the slide rails. Secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-132



AG558D

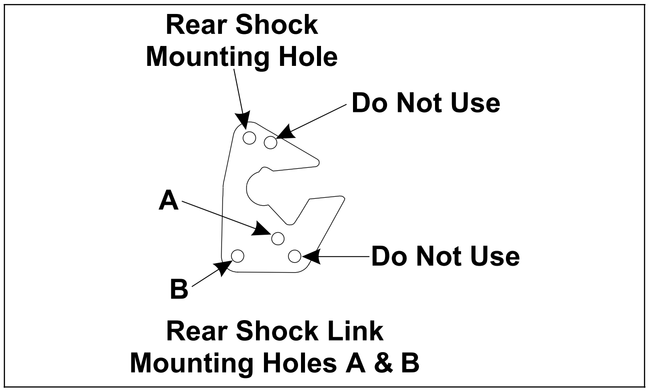
3. Position the shock links in the appropriate holes of the idler arm brackets (see 2000 Suspension Mounting Location Chart in this section). Place a spacer between the center of the brackets; then place a flat washer on the cap screw. Insert the axle links into the upper shock link eyelets; then insert the cap screw with washer through the eyelets. Secure with a cap screw, washer, and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-133



AG556D

Fig. 9-134



732-688F

Fig. 9-135

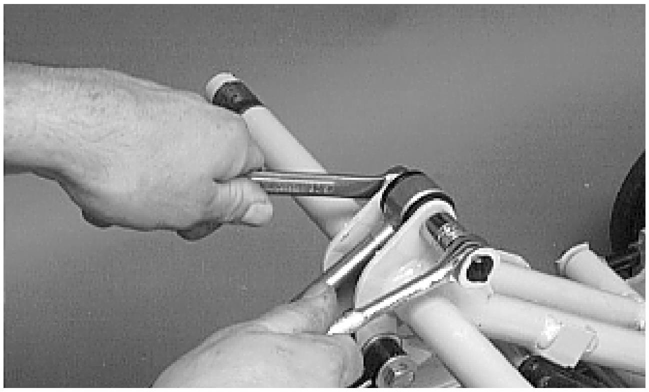


AG682D

4. Place the upper shock eyelet with bushings between the idler arm brackets making sure the spacer is properly positioned between the brackets. Secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

9

Fig. 9-136



AG467D

■ **NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

5. Grease the idler arm and rear arm grease fittings with a low-temperature grease.

6. Install the rear upper idler wheels, rear springs, and offset pivot idler (see Rear Upper Idler Wheels/Rear Springs in this sub-section).

Front Arm/Front Shock Absorber/Front Inner Idler Wheels

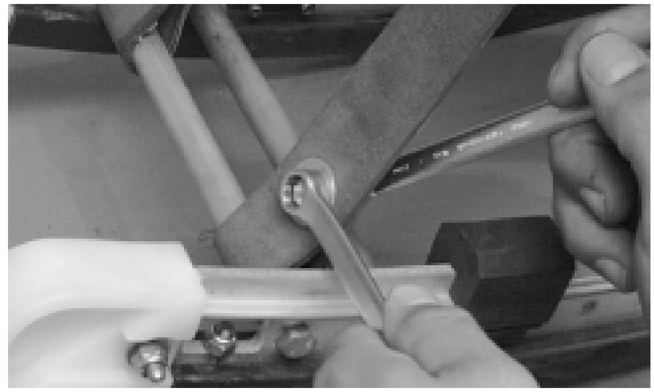
■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section), and the rear springs must be removed from the adjusting cams.**

REMOVING

■ **NOTE: On models with remote adjuster, cut the cable ties securing the front shock absorber hose to the front arm.**

1. Remove the lower cap screws and lock nuts securing the limiter straps to the rail support. Account for flat washers.

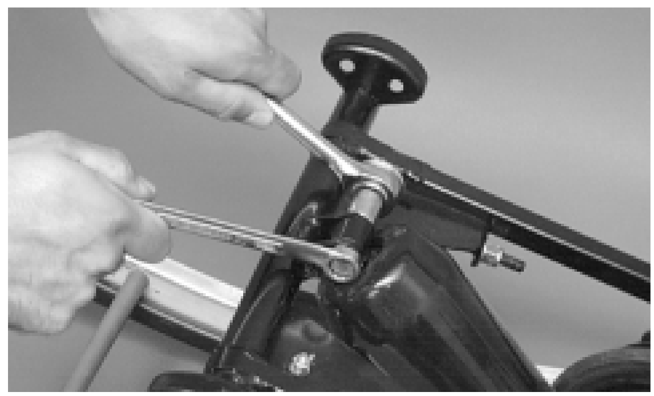
Fig. 9-137



AG632D

2. Remove the cap screw and lock nut securing the upper front shock absorber eyelet to the front arm. Pull the shock eyelet free of the bracket. Account for a serrated axle.

Fig. 9-138



AG582D

3. Remove the cap screws and lock nuts securing the front arm to the front arm mounting brackets.

Fig. 9-139



AG565D

4. Remove the front arm and account for the two front arm spacers.

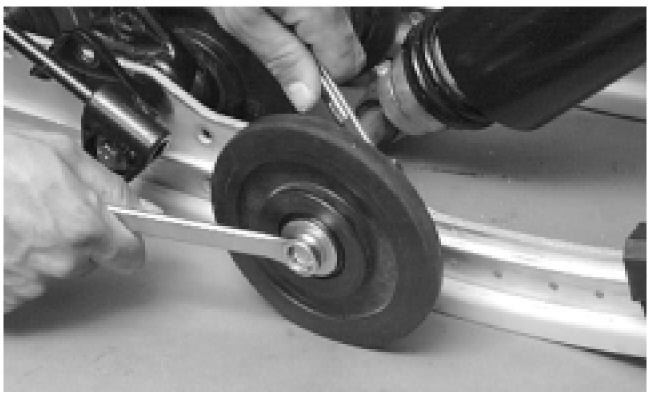
Fig. 9-140



AG485D

5. Remove the cap screws securing the front outer idler wheels to the idler wheel mounting block. Account for a lock nuts, axles, inserts, and flat washers.

Fig. 9-141



AG566D

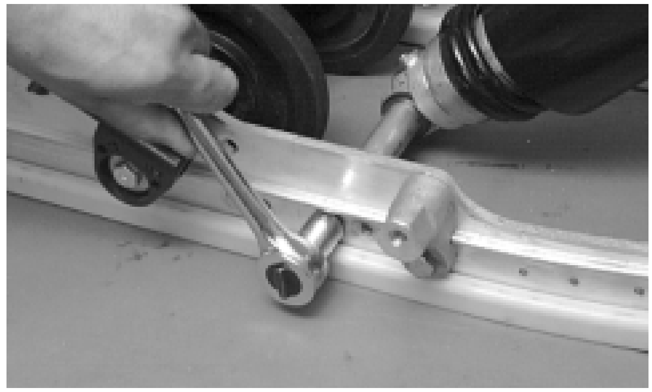
6. Remove the cap screw and lock washer securing one side of the shock mount axle. Clean the Loctite from the axle threads and cap screw threads; then reinstall the cap screw. Remove the opposite-side cap screw and lock washer; then clean the Loctite from the axle threads and cap screw threads. Remove the first cap screw and washer; then remove the axle and account for spacers, flat washers, and shock bushings. Discard the cap screws.

⚠ CAUTION

It may be necessary to heat the cap screws. Care must be taken to prevent damage to other components.

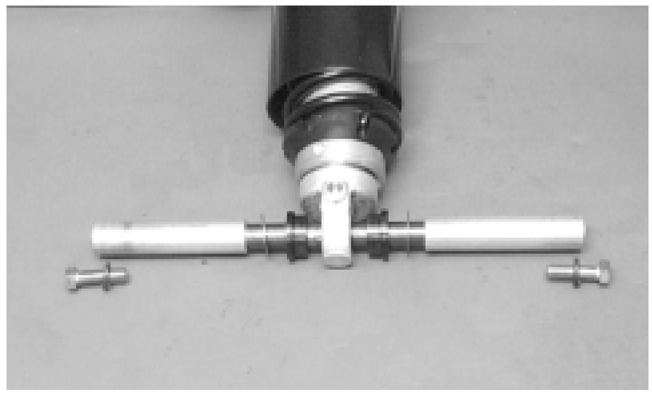
■ NOTE: New cap screws must be used when installing the shock mount axle.

Fig. 9-142



AG567D

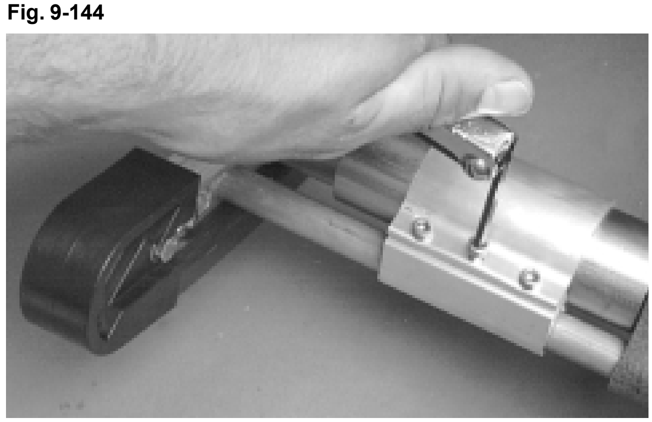
Fig. 9-143



AG568D

■ NOTE: On models with remote adjuster, loosen the three Allen-head screws securing the remote reservoir; then slide the reservoir assembly over and remove the reservoir with hoses.

Fig. 9-144



AG591D

⚠ CAUTION

Care must be taken when removing the remote reservoir that the hoses are not kinked or damaged.

7. Using a plastic mallet, tap the axle from the lower shock eyelet.

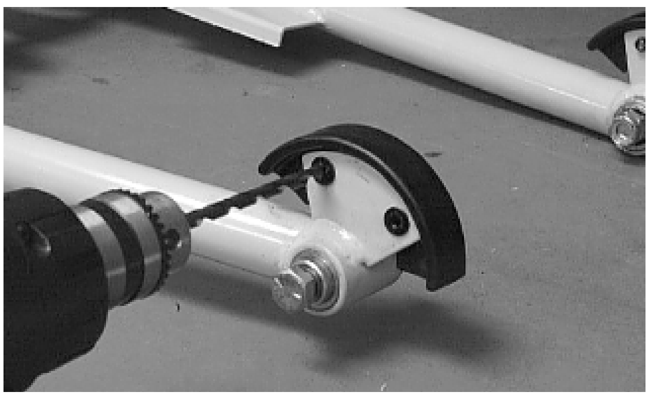
9

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect all front arm weldments for cracks or unusual bends.
2. Closely inspect all tubing for cracks or unusual bends.
3. Inspect the bearings, bushings, and front arm spacers for wear or damage.
4. Inspect the two rear track guide bumpers. If worn, drill out the rivets securing the bumpers to the arm and replace with new bumpers.

Fig. 9-145



AG486D

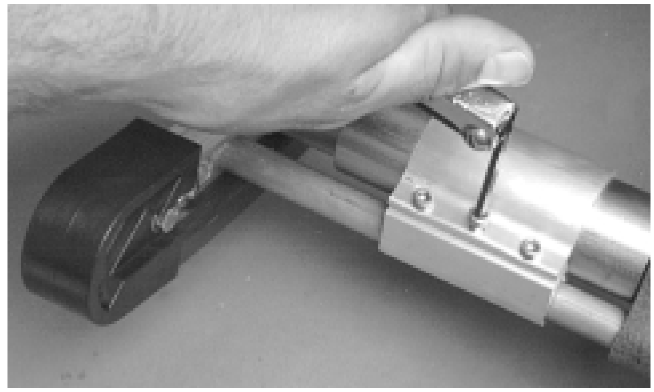
5. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.
6. Inspect the shock absorber eyelet welds (at each end) for any cracks, signs of separation, or for unthreading.
7. Inspect the shock absorber and reservoir hoses (on models with remote adjuster) for damage.

INSTALLING

1. On models with remote adjuster, place the remote reservoir into position making sure the hose is directed to the left-side of the skid frame. Secure with the three Allen-head screws coated with red Loctite #271. Tighten the outside screws first.

■ NOTE: The center Allen-head screw will not bottom on its shoulder when tightened. It bottoms on the cross-shaft to hold the assembly centered.

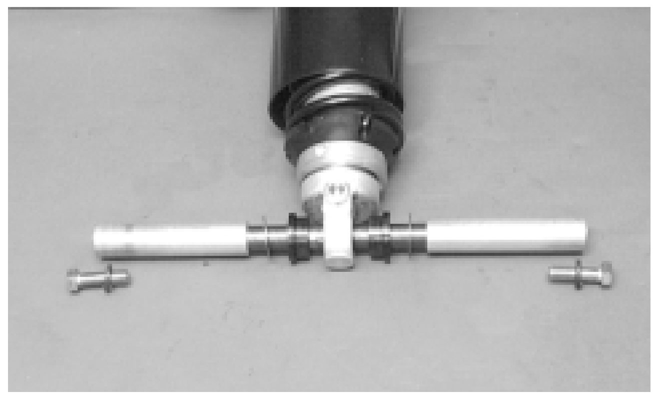
Fig. 9-146



AG591D

2. Install the axle into the lower shock eyelet bushing assembly. Apply grease to the axle; then install the spacers.

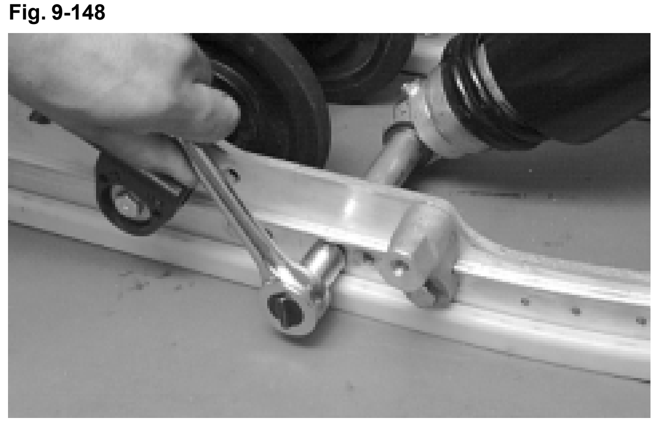
Fig. 9-147



AG568D

3. Place the shock mount axle into position on the skid frame making sure the spacers and washers are properly positioned. Secure with new cap screws (coated with green Loctite #609) and washers. Tighten to 4.2 kg-m (30 ft-lb).

Fig. 9-148



AG567D

4. Position the front arm with spacers into the mounting brackets. Secure with cap screws and lock nuts. Tighten to 4.2 kg-m (30 ft-lb).

Fig. 9-149



AG565D

5. Secure the upper shock eyelet and serrated axle in the appropriate mounting hole of the front arm (standard arm mounting position). Secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

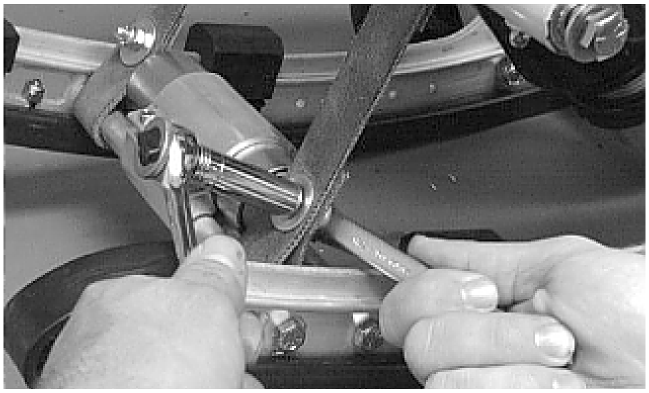
Fig. 9-150



AG564D

6. Secure the limiter straps with cap screws, washers, and lock nuts. Tighten to 1.1 kg-m (8 ft-lb).

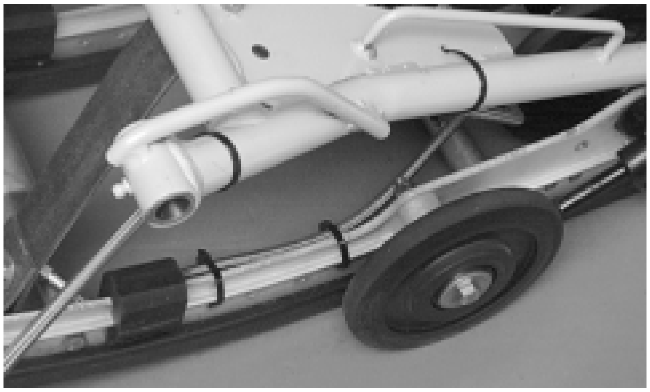
Fig. 9-151



AG480D

■ **NOTE: On models with remote adjuster, secure the shock absorber hose to the left upper arm and slide rail using cable ties. Pull the cable ties tight to prevent the hose from sliding. Compress the front arm to assure the hose does not interfere with the suspension.**

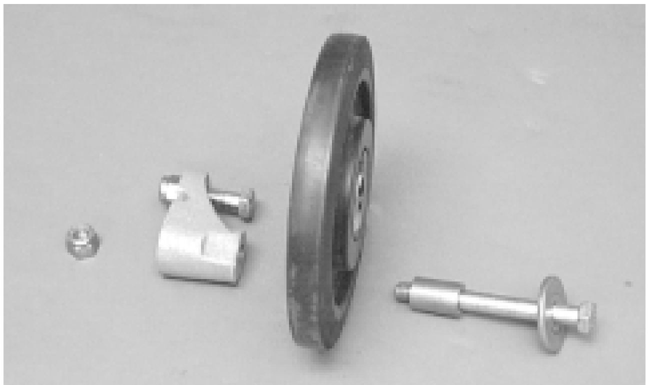
Fig. 9-152



AG590D

7. Secure the front outer idler wheels to the idler wheel mounting blocks with cap screws, flat washers, inserts, axles, and lock nuts. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-153



AG572D

Fig. 9-154



AG512D

9

Rear Shock Absorber and Shock Links

■ **NOTE: Before removing the skid frame by using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.**

⚠ CAUTION
Care must be taken when removing the spring from the adjusting cam or damage or injury could result.

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

1. Remove the rear inner idler wheels (see Rear Inner Idler Wheels in this sub-section).

Fig. 9-155



AG592D

2. Note the hole location that the spring slides are in; then remove the cap screws and flat washers securing the spring slides to the rails. Account for slide blocks.

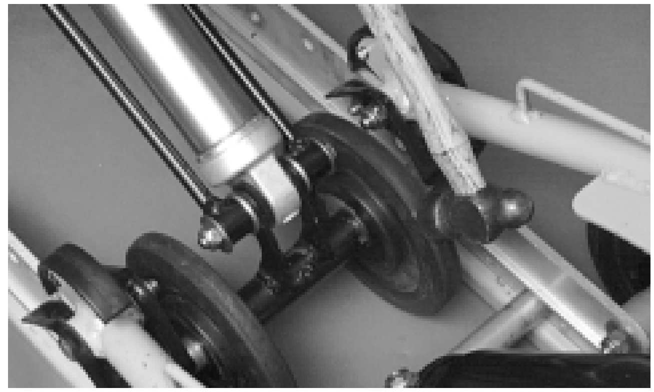
Fig. 9-156



AG662D

3. Tap the idler wheel assembly rearward until it clears the mounting brackets; then lift the idler wheel assembly upward until the shaft clears the rails.

Fig. 9-157

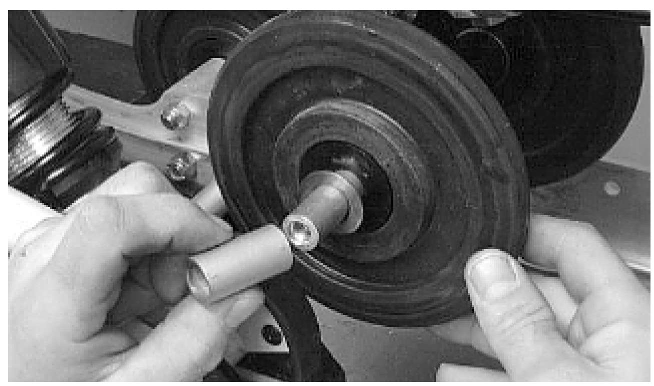


AG569D

■ **NOTE: Lay components out in order as they are removed.**

4. Remove the spacer, washer, idler wheel with inserts, washer, and inner bushing. Repeat the same procedure on the other side of the shock pivot bracket. Remove the idler wheel axle.

Fig. 9-158



AG492D

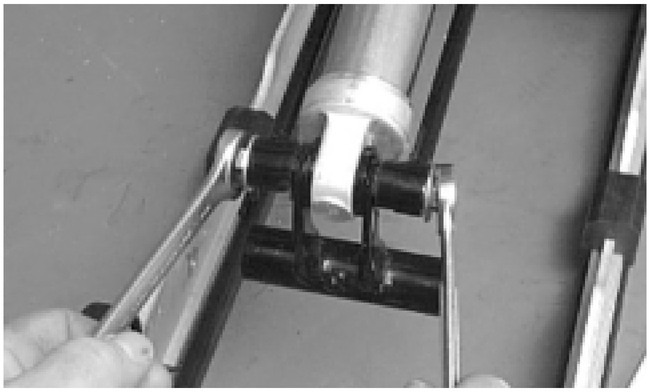
Fig. 9-159



AG663D

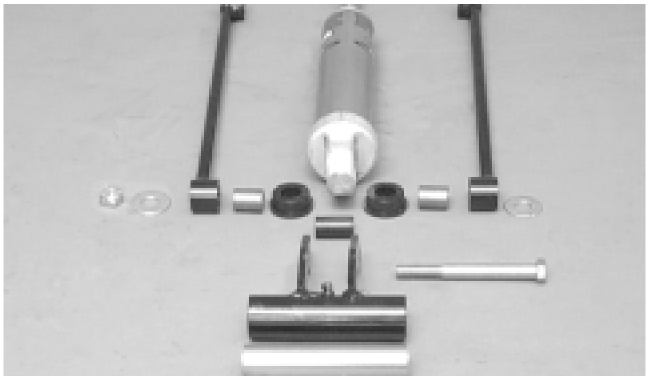
5. Disengage the shock absorber at the lower eyelet. Account for washers, axle links, bushings, shock sleeve, cap screw, and a lock nut.

Fig. 9-160



AG596D

Fig. 9-161



AG664D

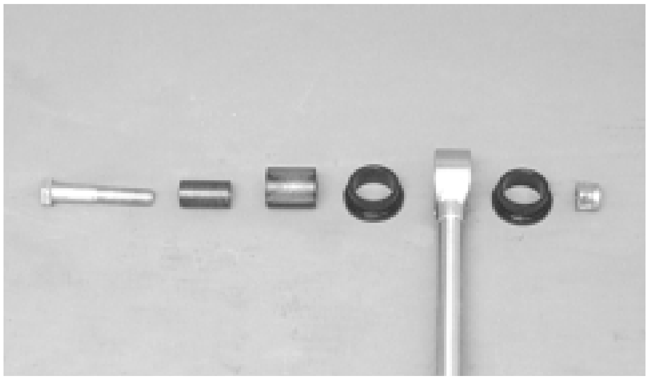
6. Disengage the shock absorber at the upper eyelet and remove the shock absorber. Account for a sleeve, cap screw, lock nut, and bushings.

Fig. 9-162



AG657D

Fig. 9-163



AG665D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean shock pivot and idler wheel axle in part-cleaning solvent. Dry with compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Clean the idler wheel bearings with a clean cloth.
3. Closely inspect the torque link arm and axles for wear, bends, or damaged splines at either end.
4. Inspect the idler wheels for signs of cracking, wear, or outer rubber separation from plastic wheel.
5. Rotate the idler wheel bearings (by hand) and inspect for any signs of binding or roughness.
6. If a bearing must be replaced, use this procedure.

⚠ CAUTION

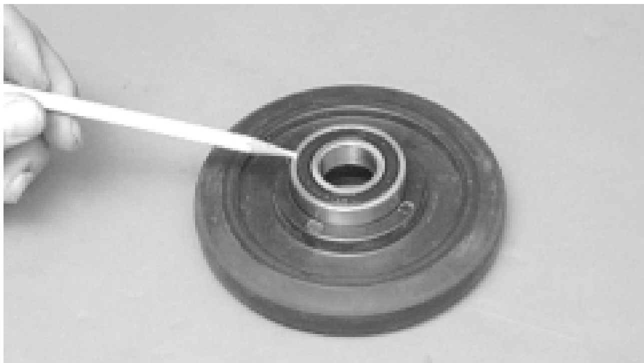
Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

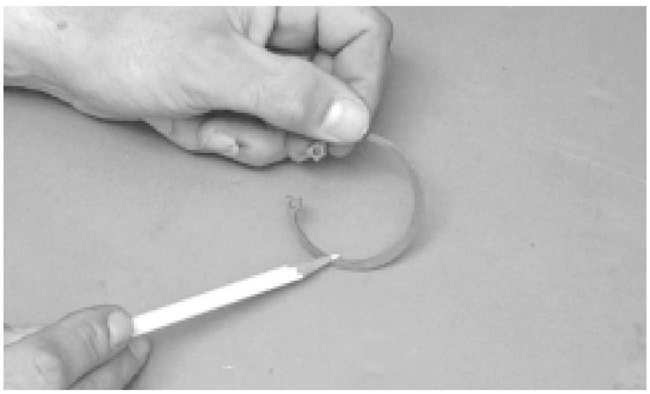
Fig. 9-164



AG538D

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.

Fig. 9-165



AG539D

7. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.

8. Inspect the rubber shock bushings located in the shock absorber eyelets for cracks or deterioration.

9. Inspect the shock absorber eyelet welds (at each end) for any cracks or signs of separation.

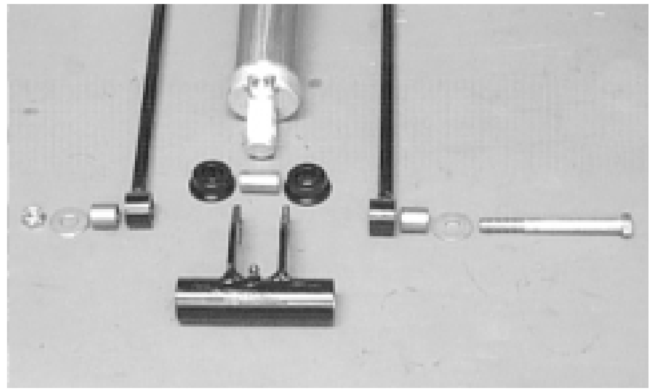
10. Inspect the welds securing the eyelets of the shock links for cracks or signs of separation. Either weld the eyelet or replace the shock link.

11. Inspect the axle surfaces for any signs of corrosion. If corrosion is found, lightly buff the surface of the axle with #400 wet-or-dry sandpaper; then apply a light coat of grease.

ASSEMBLING

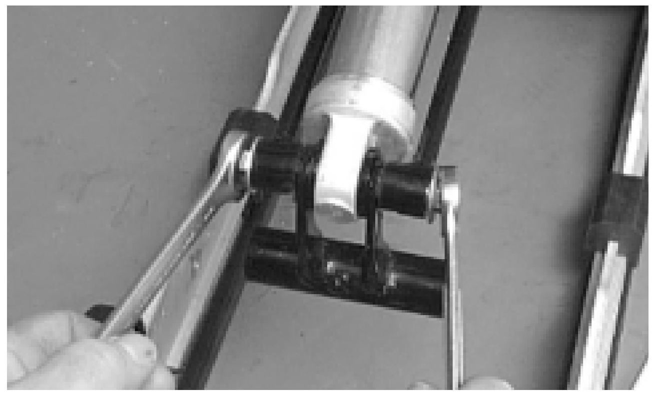
1. Secure the rear shock links and the lower shock absorber eyelet to the shock pivot bracket. Place the bushings and shock sleeve into the shock eyelet; then install the axle links into the rear shock links. Secure the assembly by installing a cap screw and flat washer through the shock link assembly, shock pivot bracket and shock eyelet assembly, shock link assembly, and a flat washer. Secure the assembly with a lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-166



AG595D

Fig. 9-167



AG596D

2. Secure the shock absorber to the idler arm with bushings, sleeve, lock nut, and a cap screw. Tighten to 3.2 kg-m (23 ft-lb).

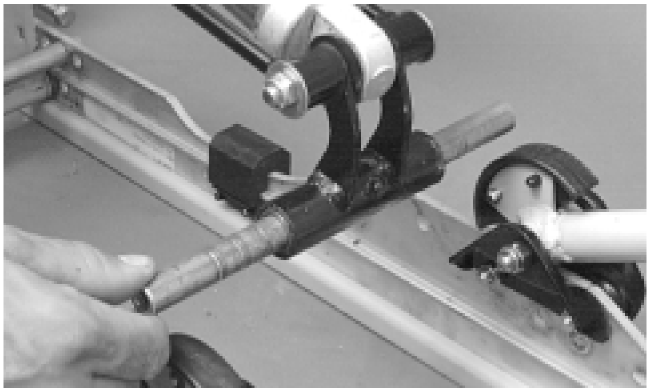
Fig. 9-168



AG657D

3. Apply a thin coat of low-temperature grease to the bushing and idler wheel axle and slide the bushing and axle into the shock pivot bracket. Have equal amounts of the axle exposed on either side of the bracket tube.

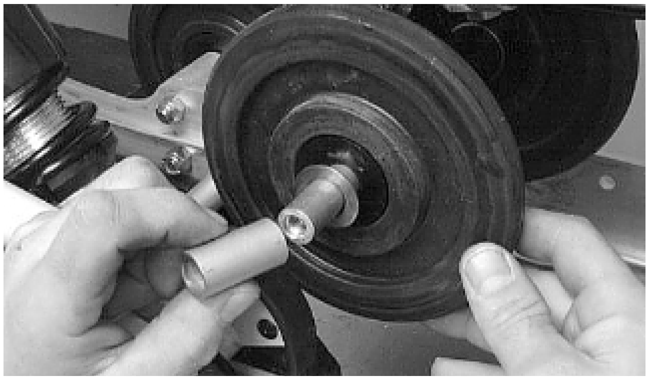
Fig. 9-169



AG597D

4. Slide a washer onto the axle; then install an idler wheel (with its larger bearing insert side facing the shock pivot), washer, and spacer. Repeat the same procedure on the other side of the shock pivot bracket.

Fig. 9-170



AG492D

5. Lower the idler wheel assembly down between the rails. Align the axle with the mounting hole just below the front arm mounting brackets (as noted during disassembly). Secure the spring slides (with spring legs in position), slide blocks, and front inner idler wheel axle assembly to the rails. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-171



AG662D

6. Secure the rear inner idler wheel axle assembly (see Rear Inner Idler Wheels in this sub-section).

Fig. 9-172



AG592D

Slide Rails

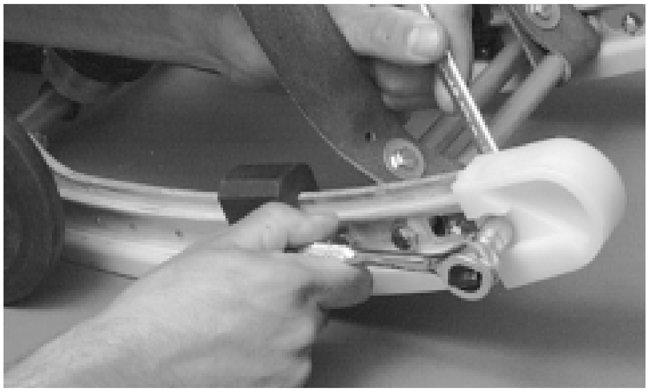
■ **NOTE: The skid frame must be removed for this procedure.**

REMOVING

■ **NOTE: When it is necessary to replace one or both slide rails, it is recommended that one slide rail be removed at a time. The remaining slide rail will then hold the crossbraces, axles, and brackets in their correct assembly order. Always mark the mounting hole locations during disassembly to speed up the assembly process and to prevent any damage. This method is much quicker than to completely disassemble the entire skid frame. To replace either rail, use the following procedure.**

1. Remove the end cap from the slide rail. Account for a cap screw, lock nut, and two flat washers.

Fig. 9-173



AG506D

2. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail.

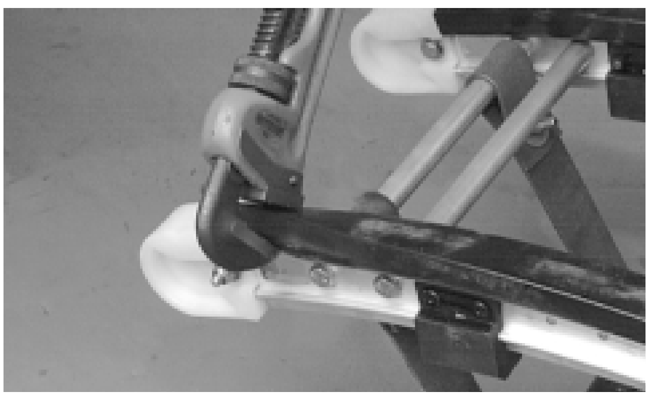
Fig. 9-174



AG509D

3. Using a pipe wrench and starting from either end, hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.

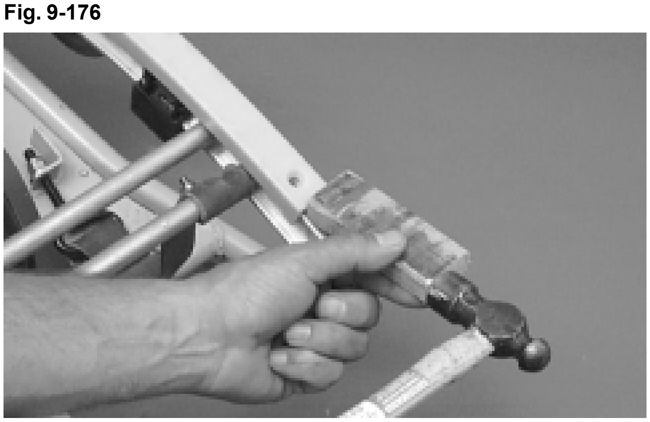
Fig. 9-175



AG617D

■ **NOTE: The wear strip can also be driven off the slide rail; however, it is quicker to use the pipe wrench.**

Fig. 9-176

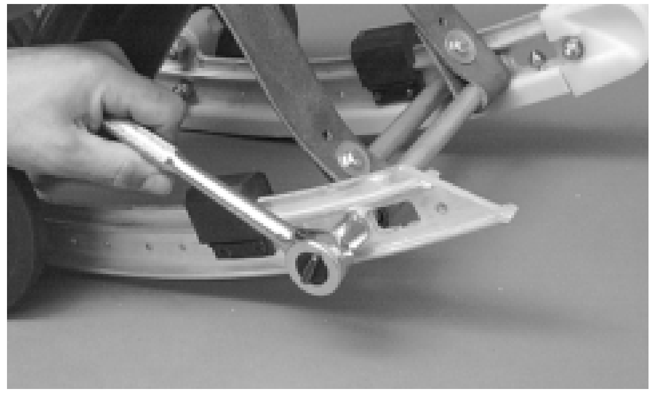


AG510D

4. Remove the cap screws securing the crossbraces to the slide rail.

■ **NOTE: On models with remote adjuster, cut the cable ties securing the hose to the slide rail and arm.**

Fig. 9-177



AG511D

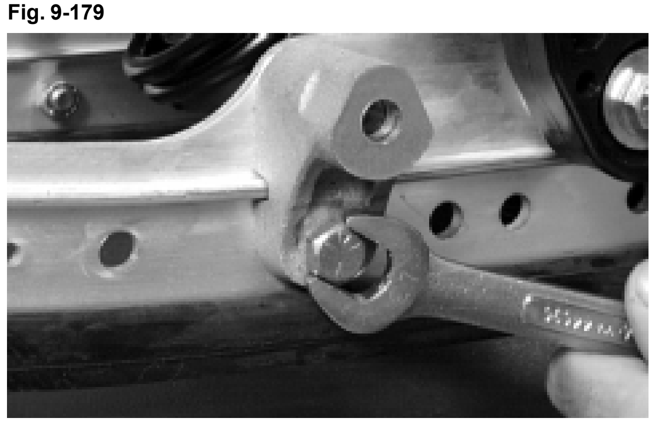
5. Remove the cap screws and lock nuts securing the front outer idler wheel and the idler wheel mounting block. Account for flat washers and an axle.

Fig. 9-178



AG512D

Fig. 9-179



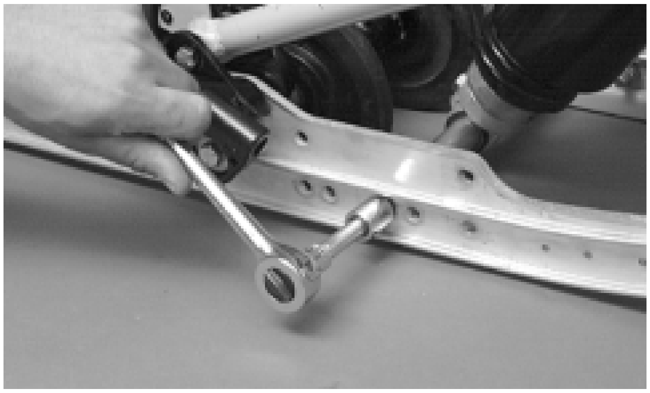
AG686D

6. Remove the cap screws and lock washers securing the front shock mount axle. Discard the cap screws.

⚠ CAUTION

It may be necessary to heat the cap screws.

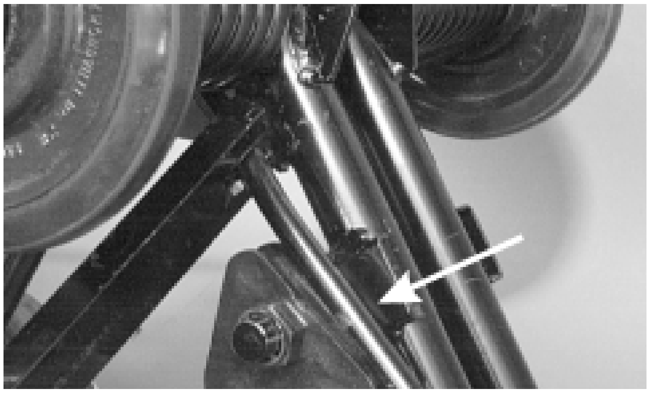
Fig. 9-180



AG514D

7. Remove the short spring leg from the adjusting cam.

Fig. 9-181



AG624DA

8. Remove the cap screw and flat washer securing the spring slide to the rail. Account for a spacer and the slide block.

Fig. 9-182



AG515D

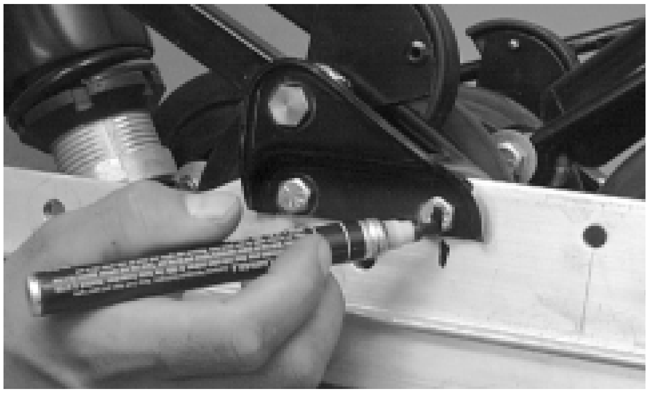
Fig. 9-183



AG680D

9. Mark the mounting position of the front arm mounting bracket.

Fig. 9-184



AG637D

10. Remove the cap screws securing the front arm mounting bracket. Account for lock nuts.

Fig. 9-185

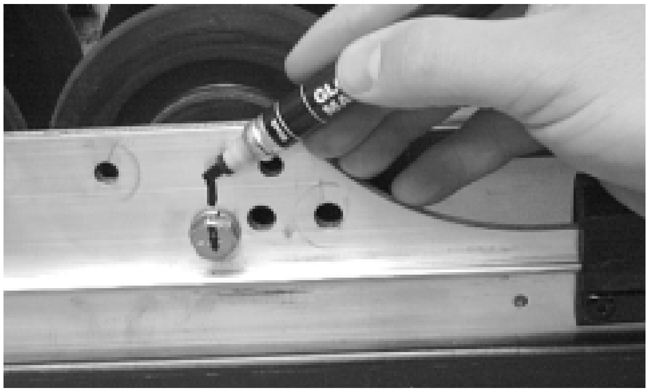


AG638D

11. Mark the mounting position of the rear inner idler wheels.

9

Fig. 9-186



AG668D

12. Remove the cap screws and lock nut securing the rear inner idler wheels.

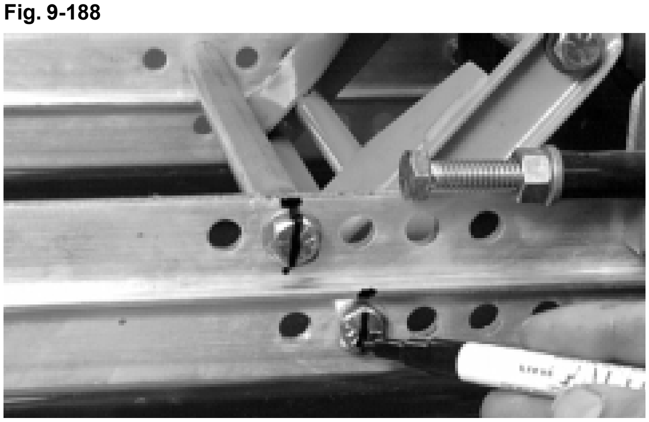
Fig. 9-187



AG592D

13. Mark the mounting position of the rear arm limiter and rear arm.

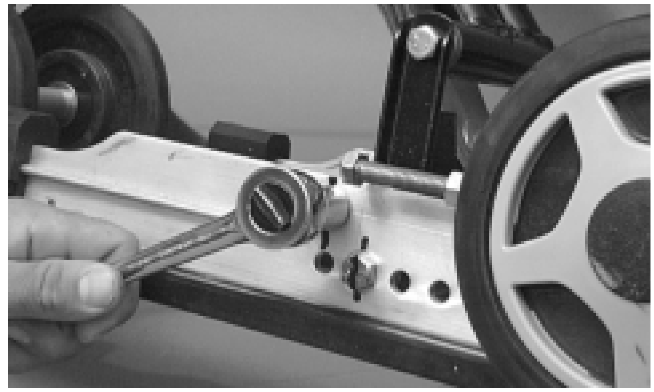
Fig. 9-188



AG683D

14. Remove the cap screw, lock washer, and lock nut from the rear arm limiter shaft.

Fig. 9-189



AG639D

15. Remove the cap screw and lock nut securing the rear arm to the rail.

Fig. 9-190



AG694D

16. Remove the idler wheel insert; then remove the cap screw and flat washer securing the rear idler wheel. Remove the idler wheel; then remove the adjuster bushing.

Fig. 9-191



AG626D

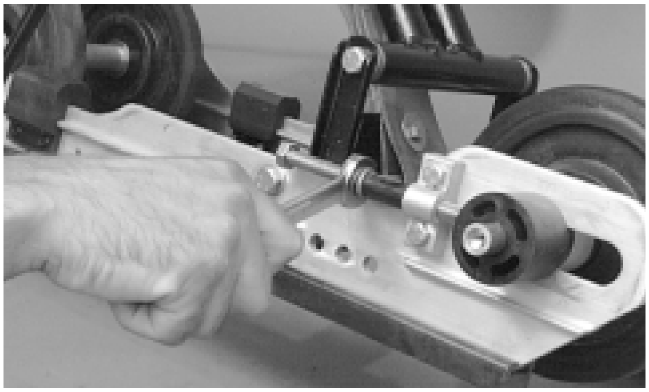
Fig. 9-192



AG551D

■ **NOTE: The adjusting bolt may have to be loosened to remove the adjuster bushing.**

Fig. 9-193

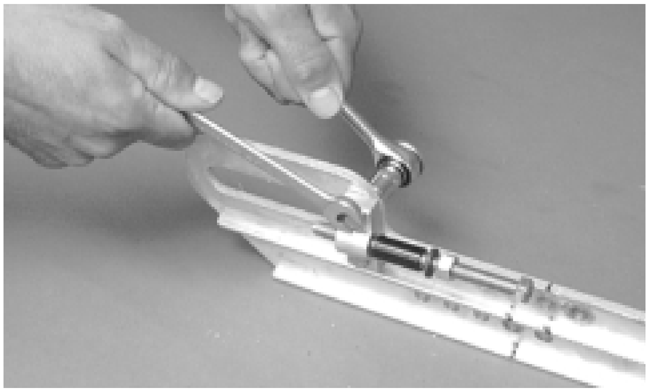


AG627D

■ **NOTE: At this point, the slide rail should be free of the skid frame components and can be removed.**

17. Remove the cap screws and lock nuts securing the track adjuster bracket.

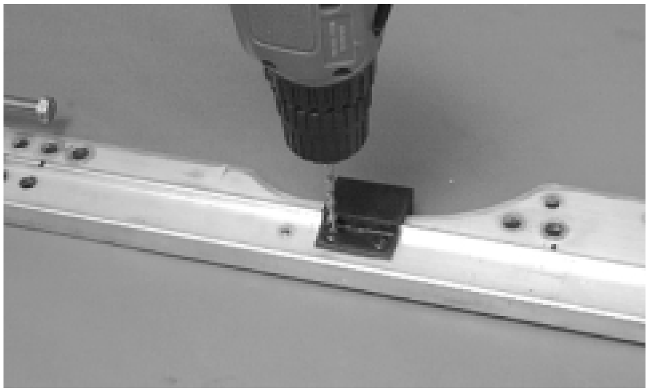
Fig. 9-194



AG527D

18. Using a drill and a 3/16-in. drill bit, drill out the rivets and remove the shock pads. Note the shock pad location for installation. Account for the retaining brackets.

Fig. 9-195



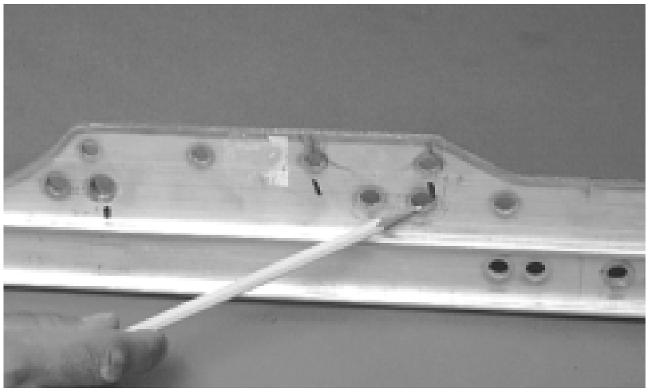
AG528D

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the slide rail for cracks or unusual bends.

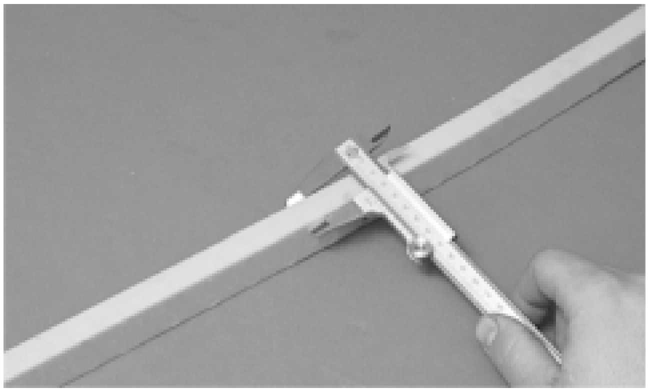
Fig. 9-196



AG529D

2. Inspect the wear strip for wear. The wear strip must be 10.7 mm (0.42 in.) thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.

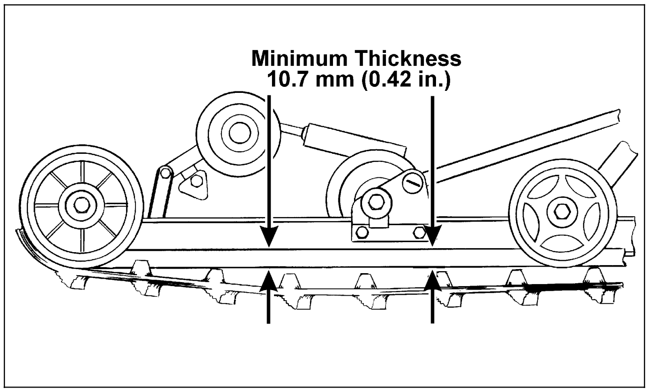
Fig. 9-197



AG530D

9

Fig. 9-198

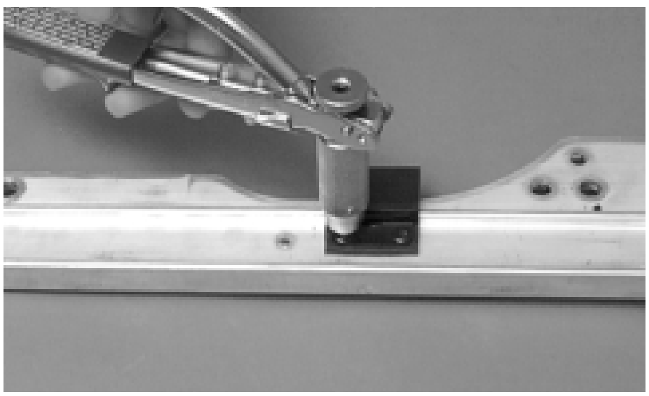


0727-726

INSTALLING

1. Install the shock pads and retaining brackets; then secure with rivets.

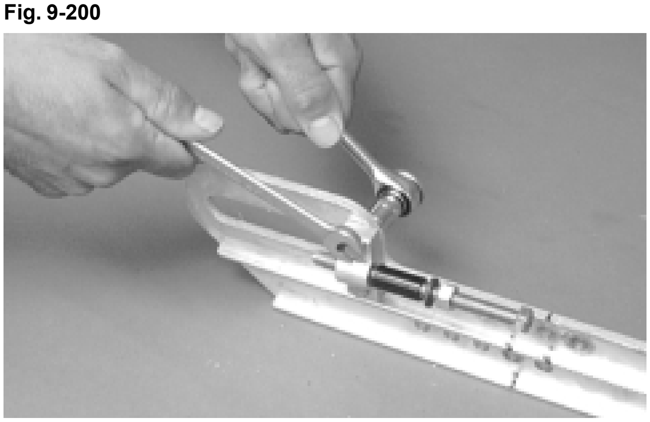
Fig. 9-199



AG531D

2. Secure the track adjuster bracket with the cap screws and lock nuts. Tighten to 1.5 kg-m (11 ft-lb).

Fig. 9-200



AG527D

3. Place the rail into position; then install the adjuster bushing and rear idler wheel. Secure with a cap screw (coated with red Loctite #271) and flat washer. Tighten to 3.2 kg-m (23 ft-lb); then install the wheel insert.

Fig. 9-201



AG551D

Fig. 9-202



AG626D

4. Install the rear arm limiter cap screw (coated with red Loctite #271) in the appropriate hole (as noted during disassembly) and tighten to 3.2 kg-m (23 ft-lb).

5. Install the rear inner idler wheels in the appropriate hole as noted during disassembly and secure with cap screws (coated with red Loctite #271) and lock nuts. Tighten to 3.2 kg-m (23 ft-lb).

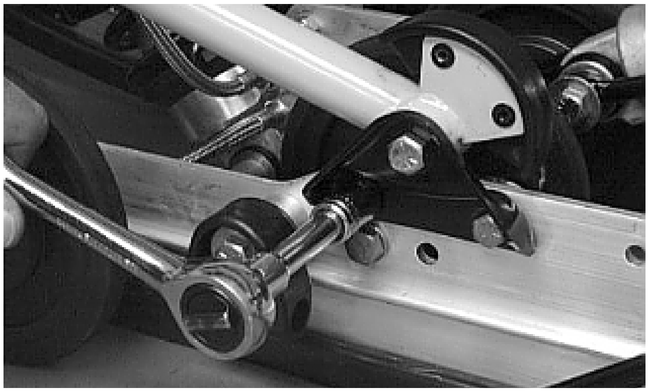
Fig. 9-203



AG592D

6. Secure the front arm mounting bracket with the cap screws (coated with red Loctite #271) and lock nuts. Tighten to 2.4 kg-m (17 ft-lb).

Fig. 9-204



AG497D

7. Place the spring into the slide blocks; then place the spring slide and slide block assembly into position on the slide rail. Secure with a cap screw (coated with red Loctite #271) and washer. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-205



AG680D

Fig. 9-206

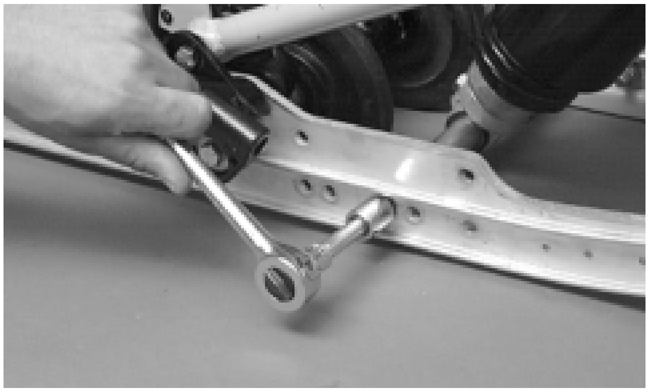


AG593D

8. Secure the front shock absorber axle with a new cap screw (coated with green Loctite #609) and lock washer. Tighten to 4.2 kg-m (30 ft-lb).

■ **NOTE: Make sure the axle threads are clean; also, always use new cap screws whenever installing.**

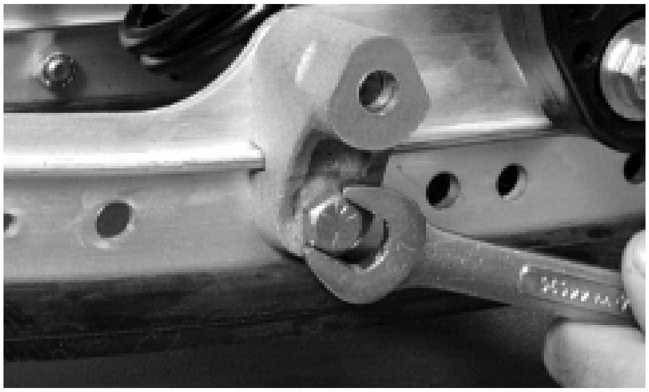
Fig. 9-207



AG514D

9. Secure the outer idler wheel mounting block with the cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-208



AG686D

10. Secure the outer idler wheel to the mounting block with a cap screw, flat washers, idler wheel, axle, and a lock nut. Tighten to 3.2 kg-m (23 ft-lb).

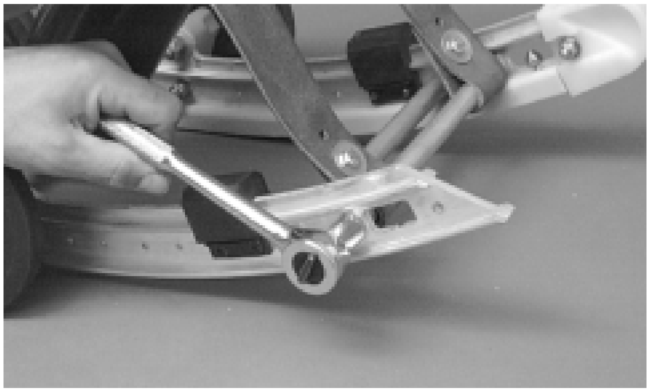
Fig. 9-209



AG512D

11. Secure the crossbraces with cap screws (coated with red Loctite #271). Tighten to 1.5 kg-m (11 ft-lb).

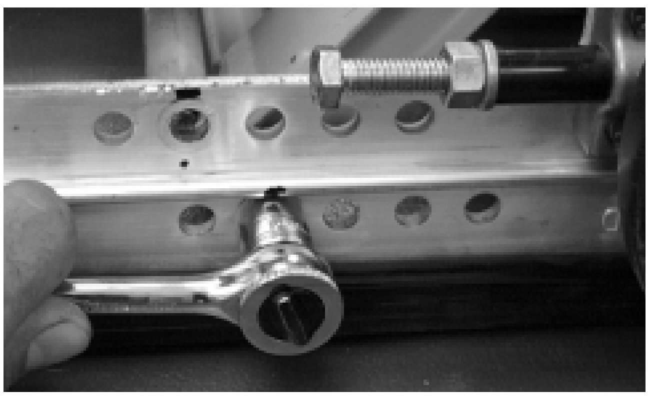
Fig. 9-210



AG511D

12. Install the rear arm in the appropriate hole as noted during disassembly; then secure with a cap screw (coated with red Loctite #271) and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

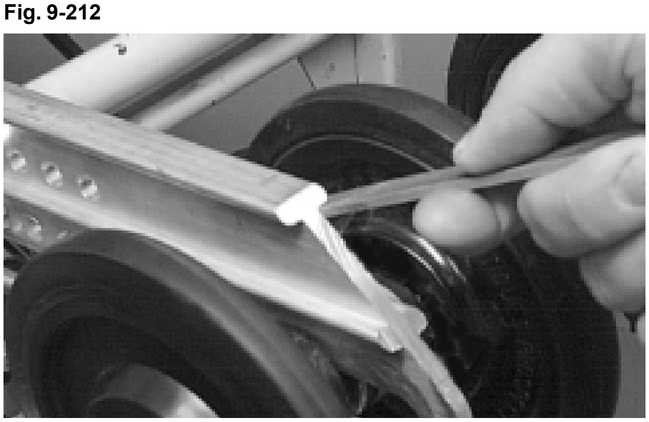
Fig. 9-211



AG694D

■ **NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.**

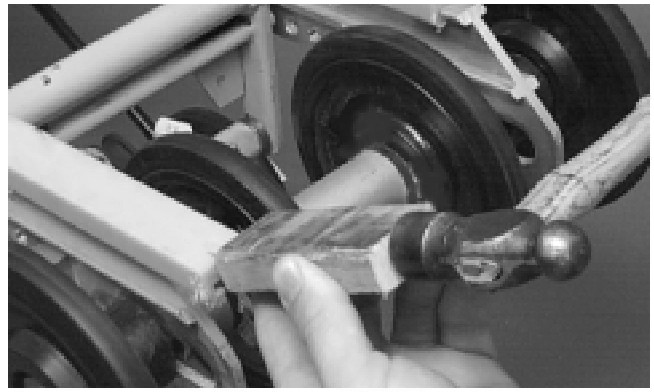
Fig. 9-212



AG534D

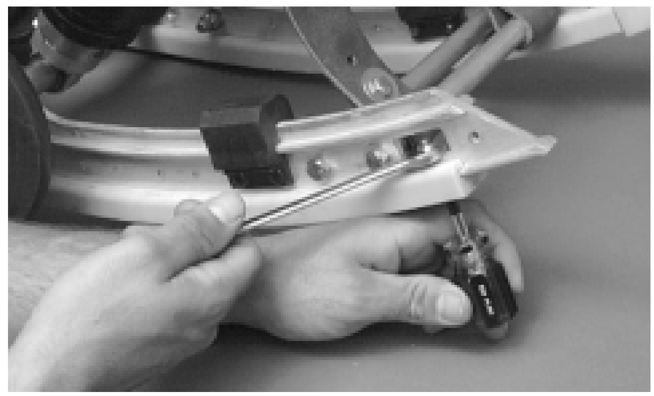
13. From the back, start the wear strip onto the rail; then using a block of wood and a hammer, drive the wear strip forward into position. Secure with a machine screw and lock nut. Tighten to 1.1 kg-m (8 ft-lb).

Fig. 9-213



AG535D

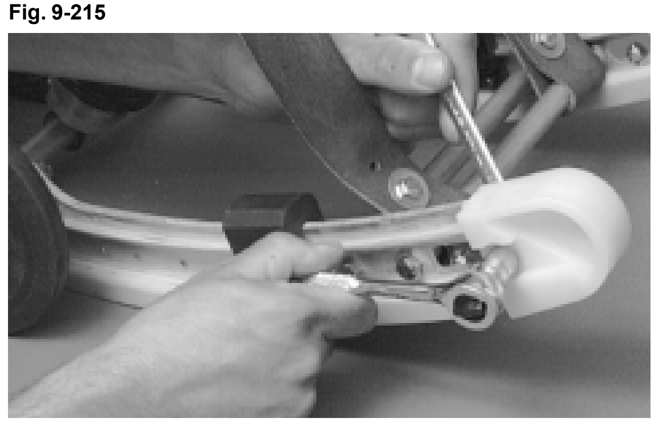
Fig. 9-214



AG509D

14. Secure the end cap onto the slide rail using a cap screw, flat washers, and a lock nut. Tighten to 1.1 kg-m (8 ft-lb).

Fig. 9-215

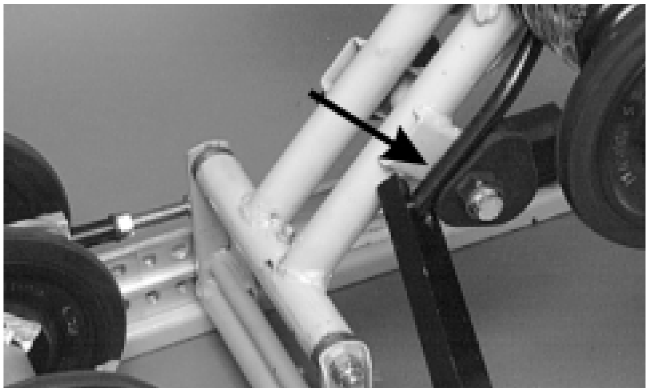


AG506D

■ **NOTE: On models with remote adjuster, install all cable ties securing the hose to the slide rail and arm.**

15. Install the short spring leg onto the adjusting cam.

Fig. 9-216



AG516DA

16. Adjust suspension.

17. After the skid frame has been installed, adjust track tension deflection (see Track Tension in this sub-section) and track alignment (see Track Alignment in this sub-section).

Installing Skid Frame

1. Place a piece of cardboard on the floor to protect against scratching and tip the snowmobile onto one side.

2. Pull the track away from the tunnel and spread open; then place the skid frame into the track.

3. Position the front of the skid frame into the tunnel and align the front arm with the appropriate mounting hole in the tunnel. Insert the cap screw with washers through the tunnel mounting hole and through the front arm. DO NOT TIGHTEN AT THIS TIME. Repeat this procedure on the other side.

■ **NOTE: To aid in centering the front arm with the hole in the tunnel, position the skid frame and track at a 45° angle to the bottom of the tunnel.**

4. Elevate the rear of the skid frame and the track into position in the tunnel.

5. Align the offset pivot idler arm assembly with the appropriate hole in the tunnel. Secure the offset pivot idler arm assembly with a cap screw (coated with red Loctite #271), lock washer, and flat washer. DO NOT TIGHTEN AT THIS TIME.

■ **NOTE: Do not install the short legs of the rear springs onto the adjusting cams at this time.**

6. At this time, tighten all four skid frame mounting cap screws to 3.2 kg-m (23 ft-lb).

7. Using the Rear Suspension Spring Tool (p/n 0144-311), install the short legs of the rear springs onto the adjusting cams making sure the cams are in the same adjustment positions.

■ **NOTE: On models with remote adjuster, guide the adjuster reservoir hose through the hole in the left-side tunnel panel. Route the hose through the clamp attached to the speedometer drive; then attach to the quick-coupler.**

8. Tighten the two track tension adjusting bolt evenly until track deflection is within specifications; then lock the jam nuts to secure the adjustment.

9. Check track tension deflection and alignment; adjust if necessary (see Track Tension and Track Alignment in this sub-section).

Track Tension

⚠ WARNING

Deactivate all switches.

CHECKING DEFLECTION

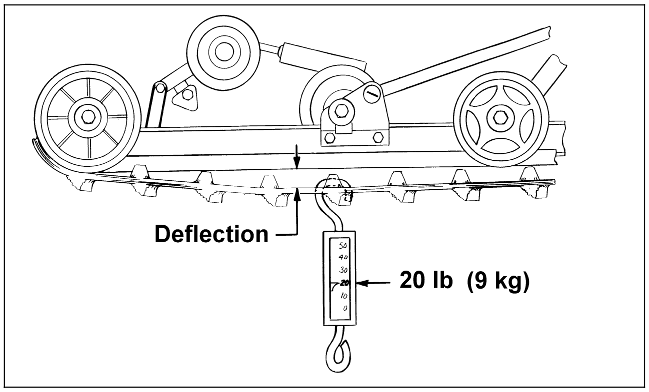
1. Tip the snowmobile on its side.

2. Hook a spring scale around a track clip at mid-span; then pull the track down with the scale to 9 kg (20 lb) and measure the distance between the bottom of the wear strip and the inside surface of the track clip. Track deflection must be within specifications.

Rear Suspension Style	Setup Tension	After Break-In Tension
FasTrack w/o Torque Sensing Link	19-25 mm (3/4-1 in.)	25-32 mm (1-1 1/4 in.)
FasTrack w/Torque Sensing Link (121 in. Track)	32-38 mm (1 1/4-1 1/2 in.)	38-44 mm (1 1/2-1 3/4 in.)
FasTrack w/Torque Sensing Link (136 in. Track)	38-44 mm (1 1/2-1 3/4 in.)	50.8-57.2 mm (2-2 1/4 in.)

9

Fig. 9-217



729-429A

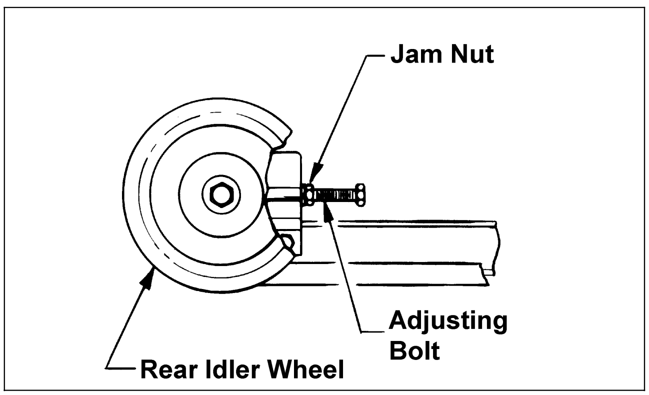
■ **NOTE: If the track is new, it will stretch slightly and take a "set" within the first 300 to 500 miles of operation.**

ADJUSTING DEFLECTION

1. Place the snowmobile up on a shielded safety stand. Check to make sure the track is 2-3 in. off the floor.

2. If the measurement is not as specified, loosen the jam nuts of the adjusting bolts.

Fig. 9-218



0727-456

3. If the measurement obtained in step 2 is more than specified, tighten the adjusting bolts. If the measurement obtained is less than specified, loosen the adjusting bolts. When the measurement is within specification range, lock the adjustment by bottoming the jam nuts against the axle housings.

■ **NOTE: Vigorously push the underside of the track up and down. Track must not hit the top of the tunnel or slap the skid frame.**

4. After correct track tension is obtained, check track alignment (see Track Alignment in this sub-section).

■ **NOTE: Track tension and track alignment are interrelated; always check both even if only one adjustment seems necessary. Always establish correct track tension before checking and/or adjusting alignment.**

Track Alignment

■ **NOTE: Proper track alignment is when the rear idler wheels are equidistant from the inner drive lugs on the inside surface of the track.**

CHECKING

1. Using a shielded safety stand, raise the rear of the snowmobile off the floor making sure the track is free to rotate.

⚠ WARNING

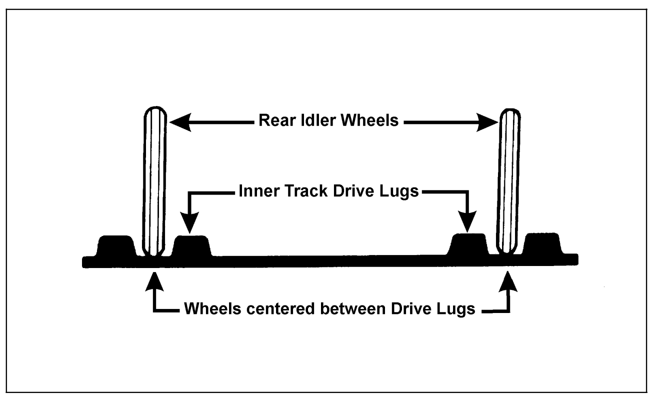
The tips of the skis must be positioned against a wall or similar object for safety. Keep hands, feet, and clothing away from moving components.

2. Start the engine and accelerate slightly. Use only enough throttle to rotate the track several revolutions. SHUT THE ENGINE OFF.

■ **NOTE: Allow the track to coast to a stop. Do not apply the brake because it could produce inaccurate alignment conditions.**

3. When the track stops rotating, check the relationship of the rear idler wheels and the inner track drive lugs. If the distance from the idler wheels to the inner drive lugs is the same on both sides, no adjustment is necessary.

Fig. 9-219



725-070A

4. On the side of the track which has the inner drive lugs closer to the rear idler wheel, loosen the adjusting bolt jam nut; then rotate the adjusting bolt clockwise 1-1 1/2 turns.

5. Continue to check the track alignment and make the necessary adjustments until proper alignment is obtained.

6. After proper track alignment is obtained, lock the jam nut against the axle housing.

■ **NOTE: Make sure correct track tension is maintained after adjusting track alignment.**

■ **NOTE: Field test the track under actual conditions and, after the field test, check track alignment and track tension; adjust as necessary.**

Repair Procedure 2 - Track/Rear Suspension

This Track/Rear Suspension sub-section (Repair Procedure 2) has been organized so each procedure can be completed individually and efficiently. Each sub-section has (as necessary) Removing, Disassembling, Cleaning and Inspecting, Assembling, and Installing procedures.

■ **NOTE: Some photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.**

Removing Skid Frame

■ **NOTE: Many service procedures can be performed without removing the skid frame. Closely observe the note introducing each sub-section for this important information.**

1. Loosen the jam nuts and two track-tension adjusting bolts.

Fig. 9-220



AG670D

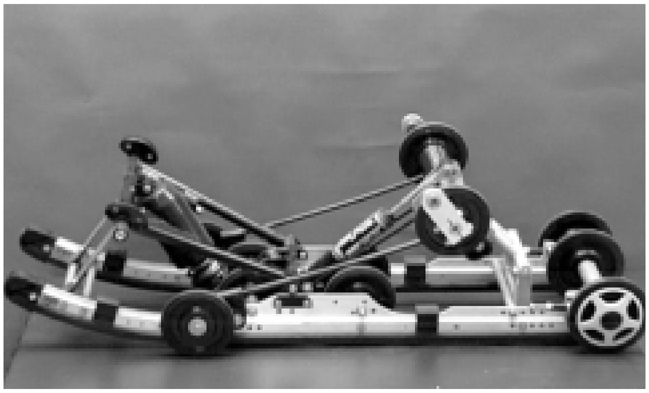
2. Place a support stand under the rear bumper; then while holding the flared bushing, remove the rear cap screws securing the skid frame to the tunnel. Account for lock washers and flat washers.

■ **NOTE: The support stand should hold the snowmobile level but not raised off the floor.**

3. Remove the front cap screws securing the skid frame to the tunnel. Account for a flat washer and a lock washer.

4. Remove the support stand; then tip the snowmobile onto one side using a piece of cardboard to protect against scratching. Remove the skid frame.

Fig. 9-221



AG671D

Wear Strips

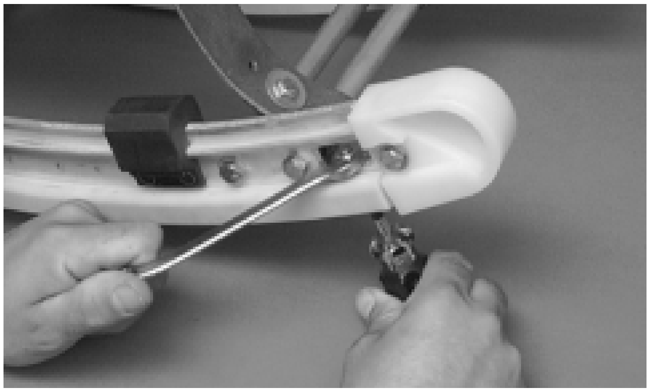
REMOVING

■ **NOTE: It is possible to remove and install a wear strip without removing the skid frame. To do this, remove the machine screw and lock nut securing the wear strip at the front of the slide rail; then align the wear strip with openings (windows) in the track and drive it rearward off the slide rail. Apply low-temperature grease to the new wear strip and slide rail; then align the wear strip with openings (windows) in the track and drive it forward onto the slide rail. Secure with the machine screw and lock nut.**

■ **NOTE: The skid frame should be removed for this procedure (see Removing Skid Frame in this sub-section).**

1. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail.

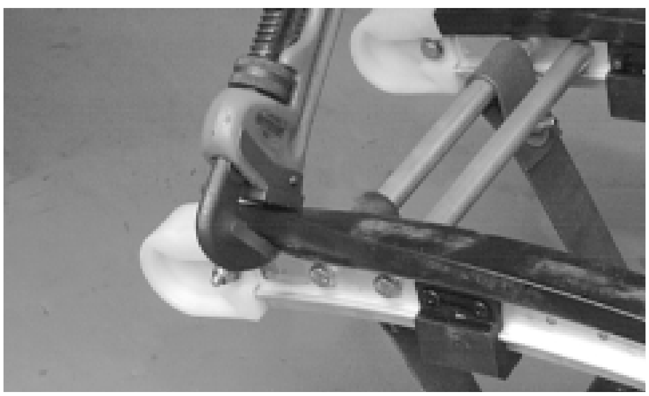
Fig. 9-222



AG504D

2. Using a pipe wrench and starting from either end, hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.

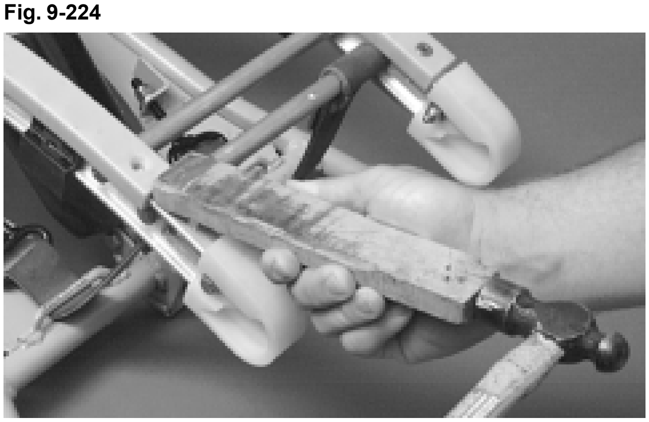
Fig. 9-223



AG617D

■ **NOTE: The wear strip can also be driven off the slide rail; however, it is quicker to use a pipe wrench.**

Fig. 9-224



AG505D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

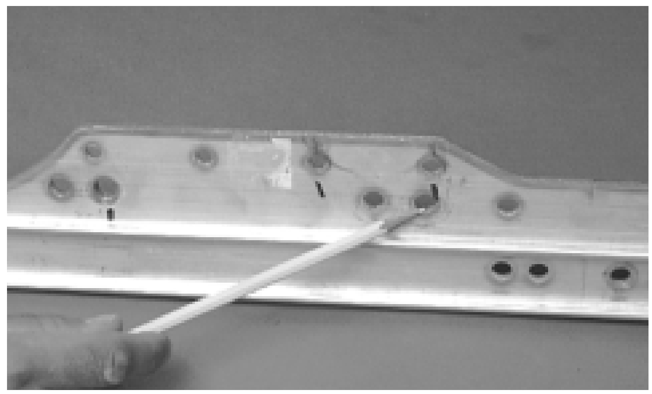
1. Clean the slide rail using parts-cleaning solvent and compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Inspect the slide rail for cracks. If any cracks are found, replace the slide rail.

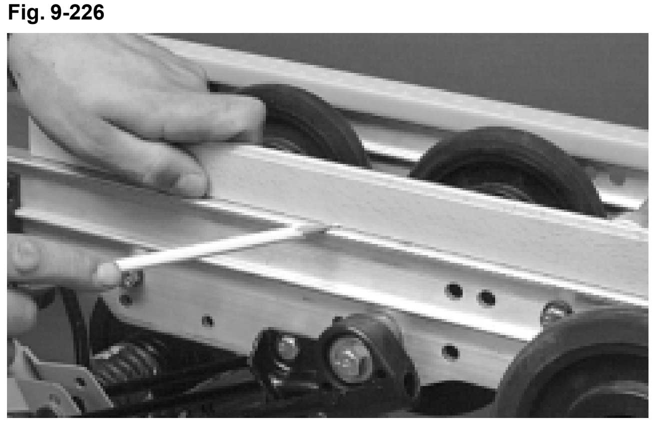
Fig. 9-225



AG529D

3. Using a straightedge, inspect the slide rail for any unusual bends. Place the straightedge along the bottom surface of the slide rail. If the rail is found to be bent, it must be replaced.

Fig. 9-226

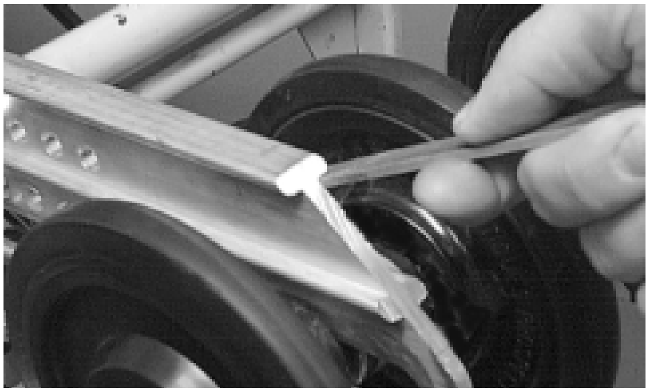


AG536D

INSTALLING

■ NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.

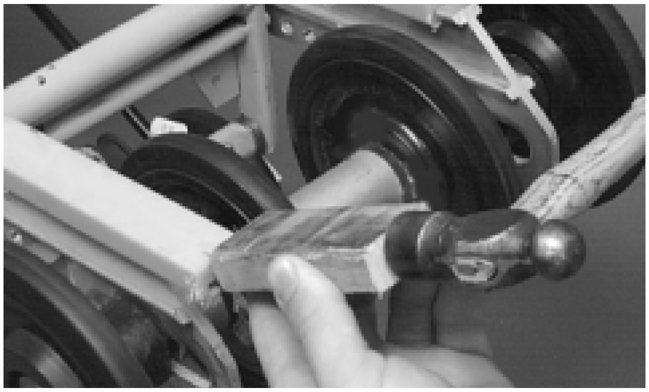
Fig. 9-227



AG534D

1. From the back, start the wear strip onto the rail; then using a block of wood and a hammer, drive the wear strip forward into position.

Fig. 9-228



AG535D

2. Secure with a machine screw and lock nut. Tighten to 1.1 kg-m (8 ft-lb).

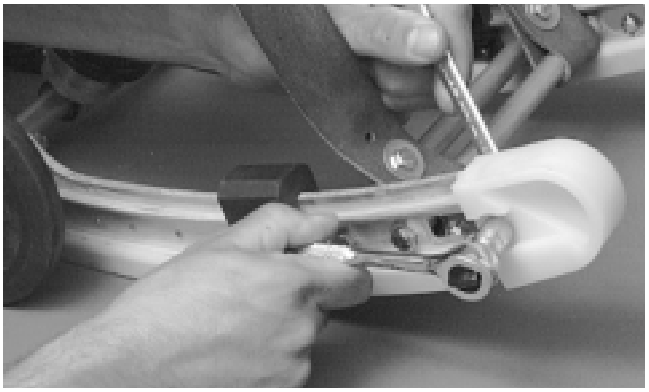
End Caps

■ NOTE: The skid frame does not have to be removed for this procedure.

REMOVING

1. Remove the lock nut, washers, and cap screw securing the end cap.

Fig. 9-229



AG506D

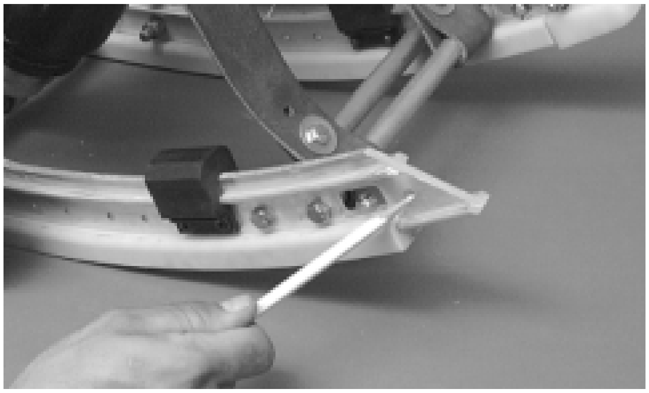
2. Using a hammer, tap the end cap off the rail.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the end cap area of the slide rail for cracks and wear.

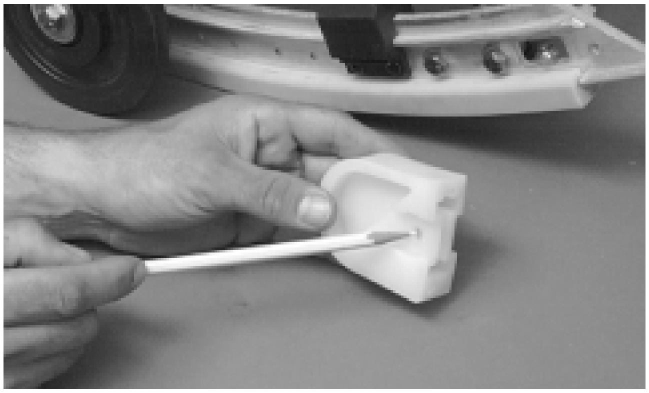
Fig. 9-230



AG507D

2. Inspect the end cap for any signs of cracking or wear.

Fig. 9-231



AG508D

3. Clean both the slide rail area and the end cap. Using compressed air, clean the areas of dirt and gravel.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

4. Inspect the cap screw for cracked, stretched, or damaged threads. Use a new lock nut when assembling.

INSTALLING

1. Position the end cap on the slide rail; then align the hole in the end cap with the hole in the slide rail.

2. Secure with a cap screw, washers, and lock nut. Tighten to 1.1 kg-m (8 ft-lb).

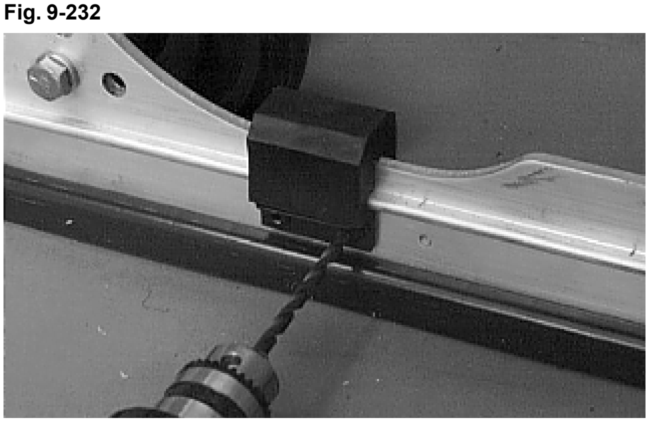
Shock Pads

■ **NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

1. Using a 3/16-in. drill bit drill out the rivets securing the shock pad to the slide rail. Account for the retaining brackets.

Fig. 9-232



AG476D

2. Remove the shock pad.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the pad and retaining brackets for damage or wear.

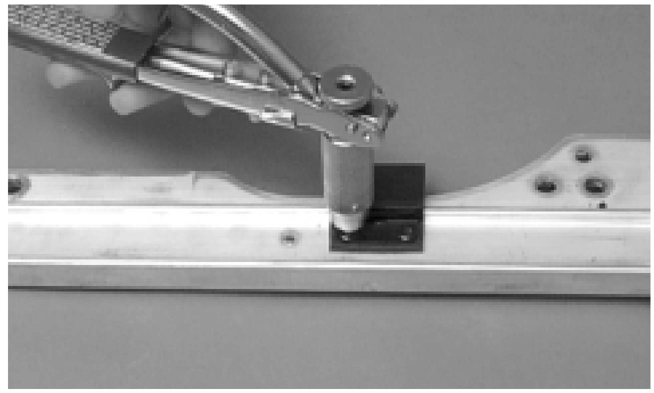
2. Inspect the rivet holes in the slide rail for damage or elongation.

INSTALLING

1. Place the pad and retaining brackets into position on the slide rail.

2. Secure the pad assembly with rivets.

Fig. 9-233



AG531D

Front Outer Idler Wheels

■ **NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

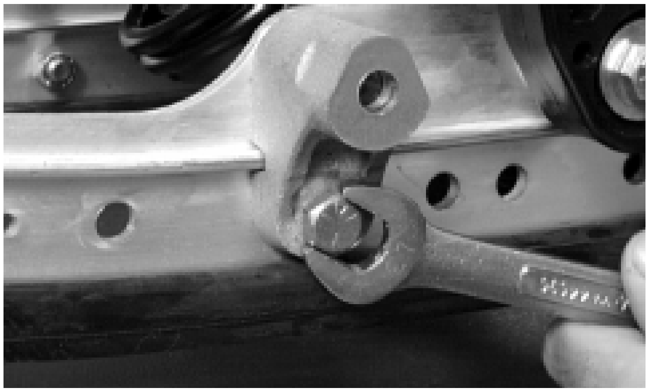
1. Remove the cap screws and lock nuts securing the front outer idler wheel and the idler wheel mounting block. Account for flat washers and an axle.

Fig. 9-234



AG678D

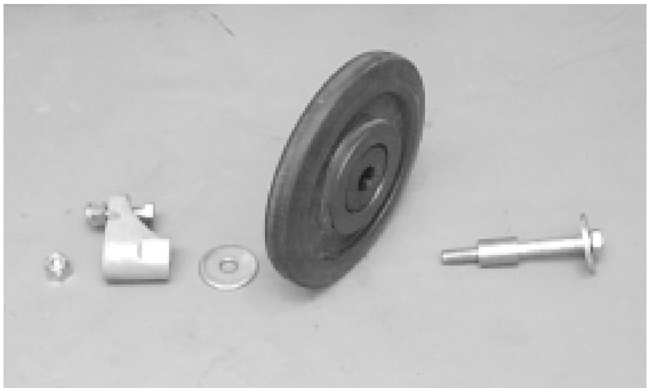
Fig. 9-235



AG686D

2. Note the locations of the flat washers for assembly purposes. The washers are to be installed next to the idler wheels.

Fig. 9-236



AG622D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and each plastic hub for cracks or damage.
3. Rotate the idler wheel bearing (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

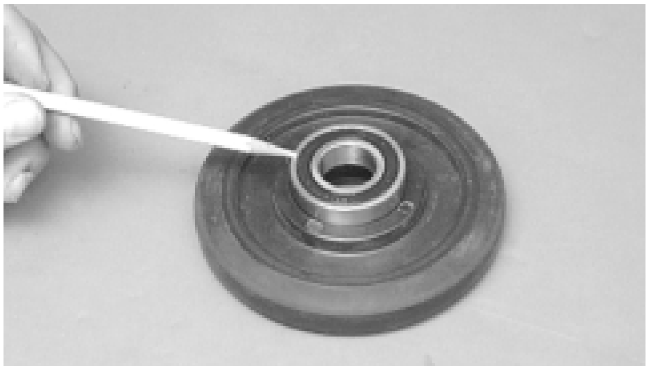
⚠ CAUTION
Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out from the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

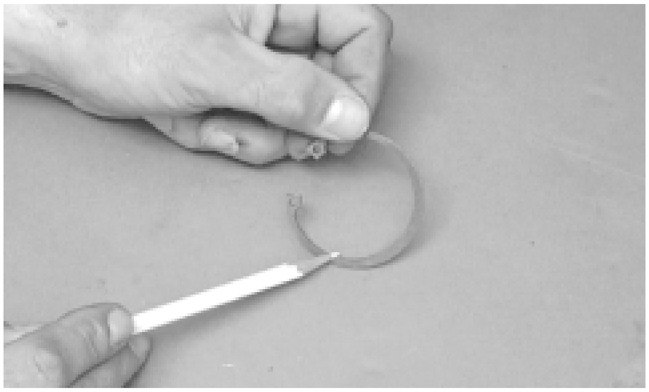
Fig. 9-237



AG538D

D. Install the snap ring making sure the "sharp side" is directed away from the bearing.

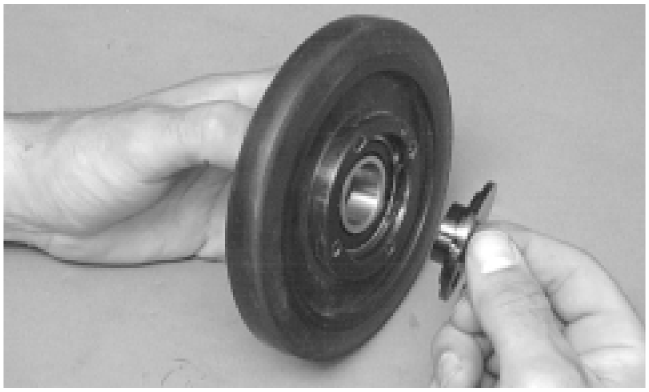
Fig. 9-238



AG539D

E. Install the insert.

Fig. 9-239



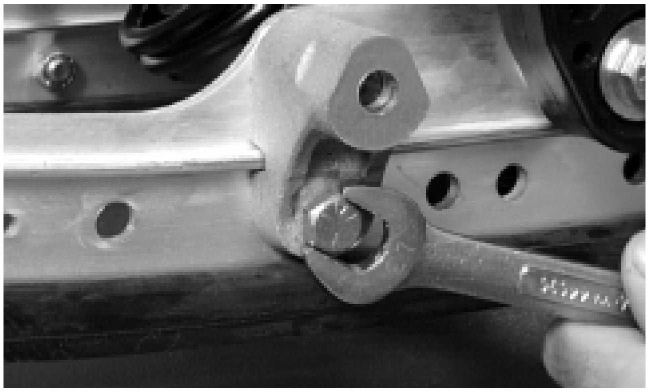
AG540D

INSTALLING

1. Secure the mounting block on the slide rail with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

9

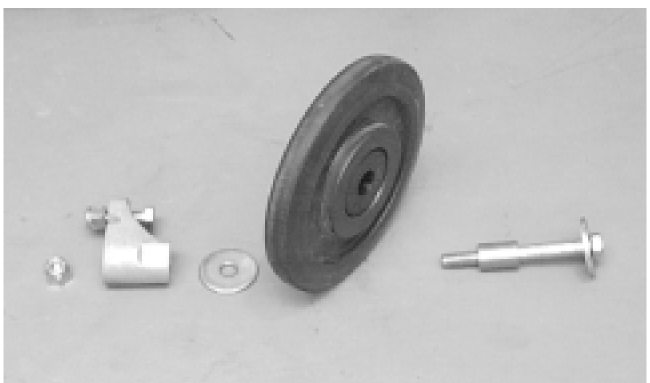
Fig. 9-240



AG686D

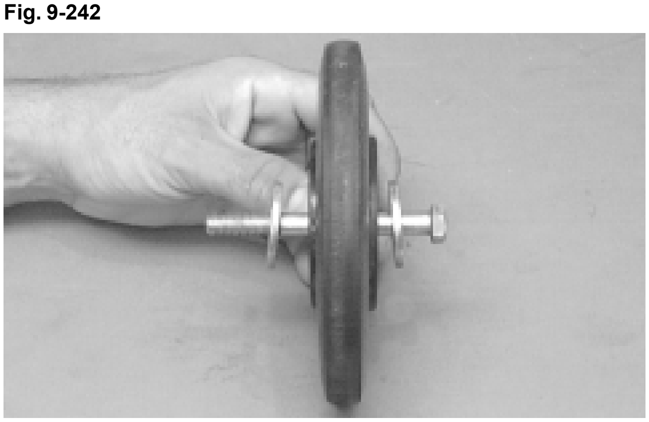
2. Place the idler wheel and axle against the mounting block making sure there is a flat washer on both sides of the idler wheel.

Fig. 9-241



AG622D

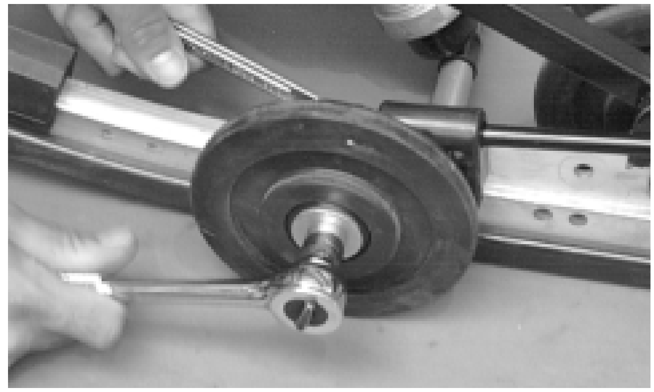
Fig. 9-242



AG623D

3. Secure the idler wheel assembly with a cap screw and a lock nut. Tighten cap screws to 3.2 kg-m (23 ft-lb).

Fig. 9-243



AG618D

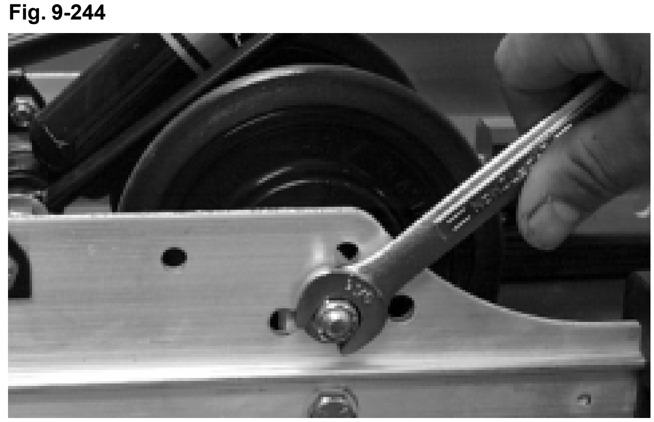
Rear Inner Idler Wheels

■ **NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

1. Remove the cap screws and lock washers securing the rear inner idler wheel and the idler wheel mounting block. Account for a flat washer and an axle.

Fig. 9-244



AG672D

Fig. 9-245

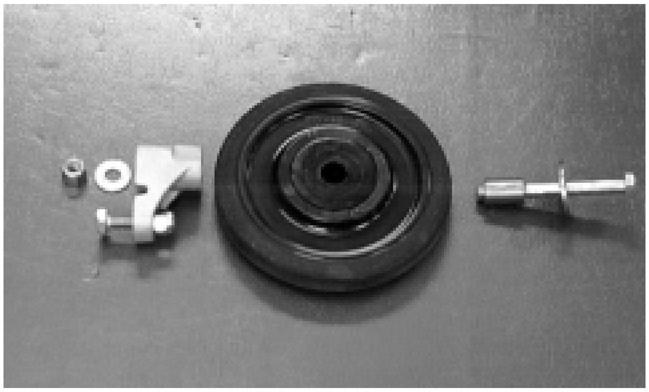


AG673D

2. Note the locations of the flat washers for assembly purposes.

■ NOTE: The large, thick washer must be installed next to the idler wheel. The small, thin washer must be installed against the slide rail.

Fig. 9-246



AG674D

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the bearing with a clean cloth.
2. Inspect each idler wheel and plastic hub for cracks or damage.
3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.
4. If a bearing must be replaced, use this procedure.

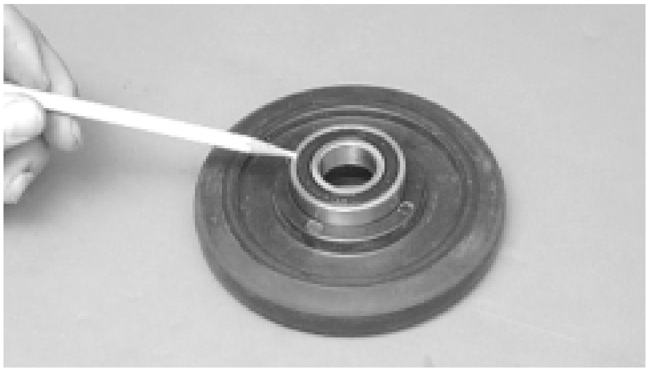
⚠ CAUTION
Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

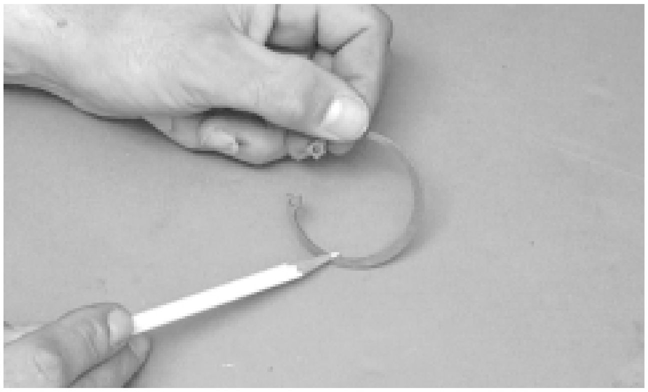
Fig. 9-247



AG538D

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.

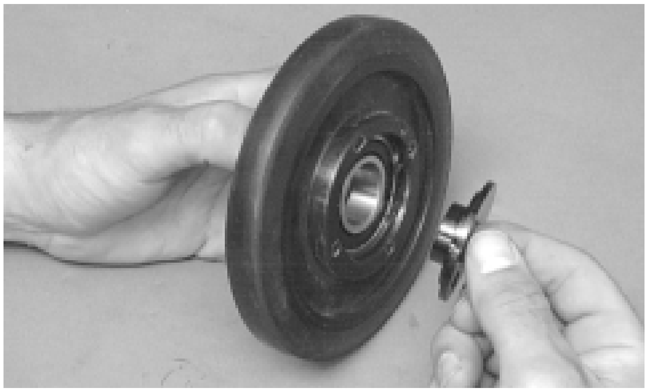
Fig. 9-248



AG539D

E. Install the insert.

Fig. 9-249



AG540D

9

INSTALLING

1. Secure the mounting block on the slide rail with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

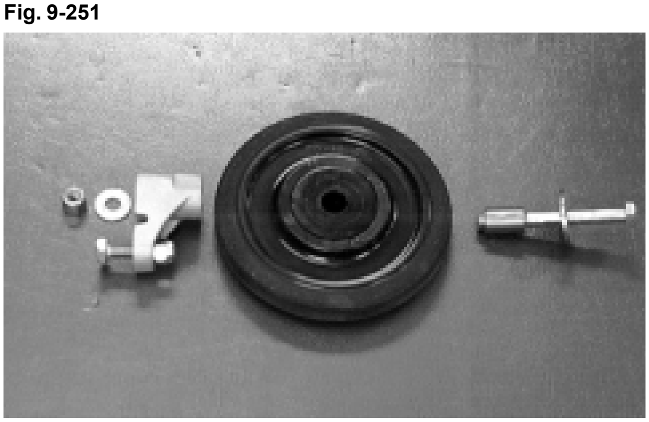
Fig. 9-250



AG673D

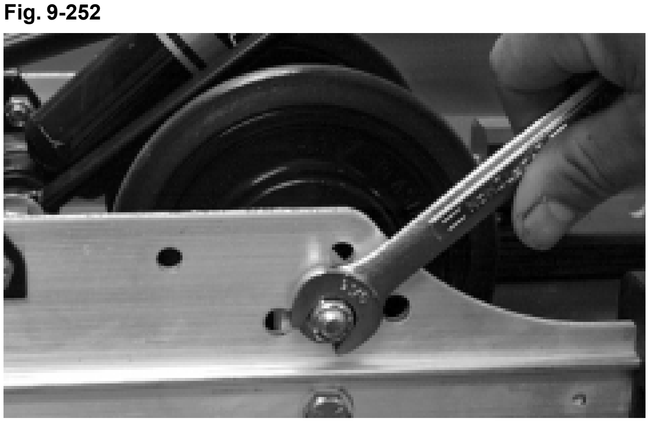
2. Place the idler wheel and axle into position against the mounting block making sure there is a flat washer on the inside of the idler wheel. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-251



AG674D

Fig. 9-252



AG672D

Rear Upper Idler Wheels/Rear Springs

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

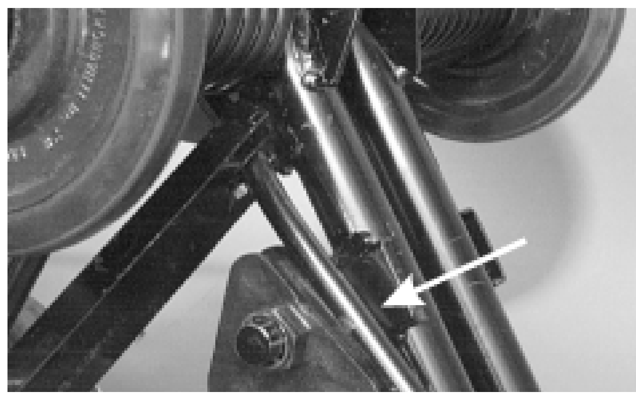
REMOVING

1. Using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

⚠ WARNING

Care must be taken when removing the spring or damage or injury could result.

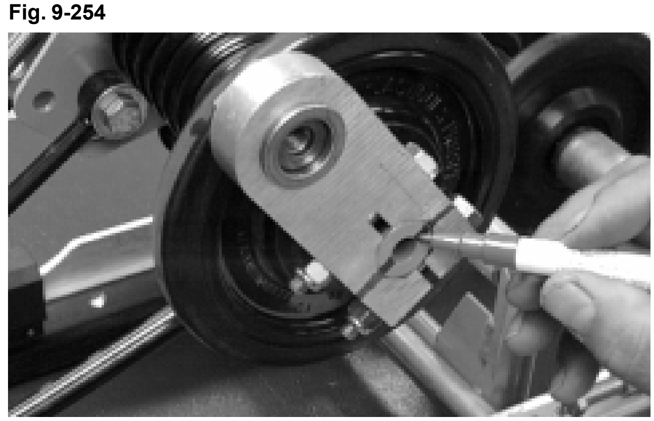
Fig. 9-253



AG624DA

2. Mark the offset pivot idler and the idler arm for assembly purposes.

Fig. 9-254

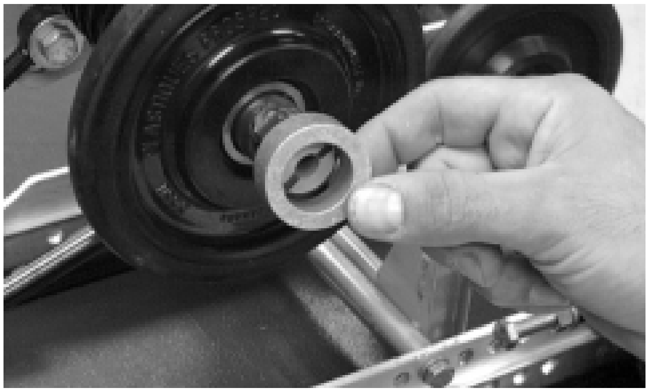


AG675D

3. Remove the cap screws, washers, and lock nuts securing the offset pivot idler to the upper idler wheel; then remove the offset pivot idler assembly.

4. Remove the spacer.

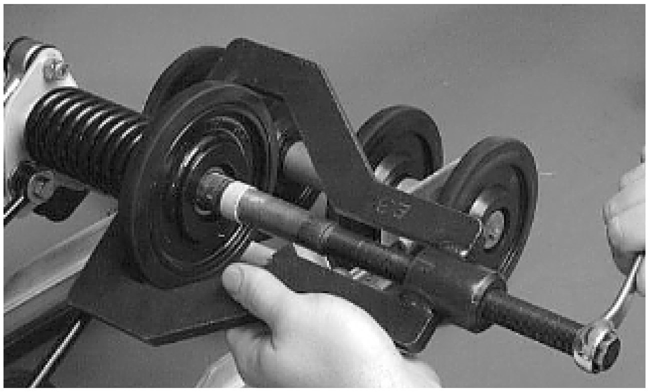
Fig. 9-255



AG677D

■ **NOTE: It may be necessary to use the Idler Wheel Puller Kit (p/n 0644-122) to remove the wheel.**

Fig. 9-256



AG461D

5. Remove the cap screw, washer, and lock nut securing the front outer idler wheel; then remove the idler wheel.

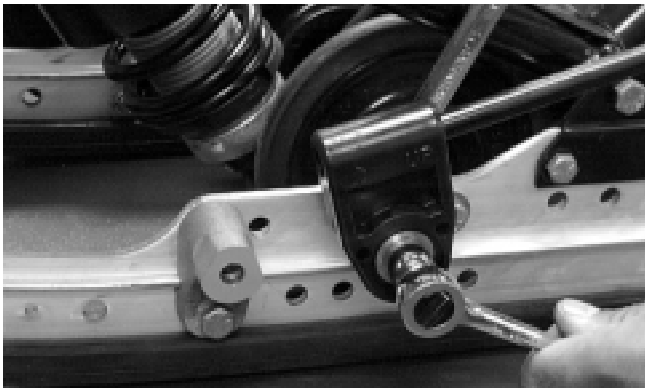
Fig. 9-257



AG678D

6. Remove the cap screw and flat washer securing the spring slide to the rail. Account for a slide block and washer.

Fig. 9-258



AG679D

Fig. 9-259



AG680D

7. Remove the spring and sleeve from the idler arm.

Fig. 9-260



AG681D

■ **NOTE: Use the same procedure for the other side.**

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearing with a clean cloth.

2. Inspect each idler wheel and plastic hub for cracks or damage.

9

3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.

4. If a bearing must be replaced, use this procedure.

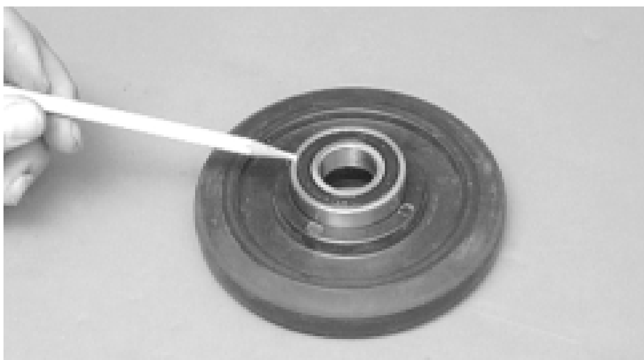
> **⚠ CAUTION**
>
> **Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.**

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

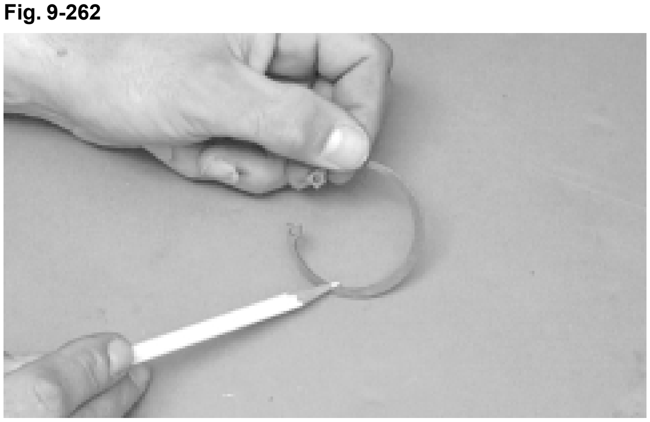
Fig. 9-261



AG538D

D. Install the snap ring making sure the "sharp side" is directed away from the bearing.

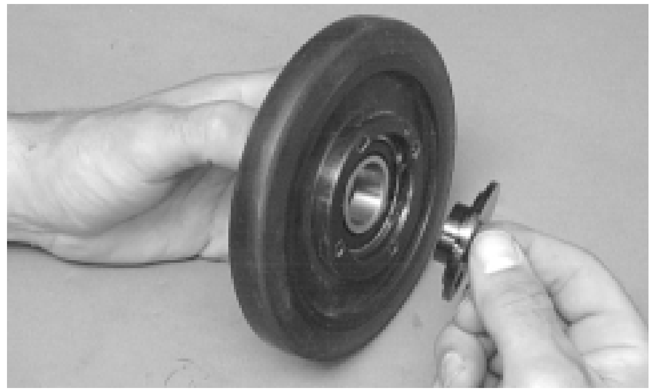
Fig. 9-262



AG539D

E. Install the insert.

Fig. 9-263



AG540D

5. Inspect the spring, spring slide, sleeve, washers, slide block insert, and shaft area for wear.

6. Inspect the adjusting cams and arms for cracks.

INSTALLING

1. Slide the sleeve and spring onto the idler arm.

Fig. 9-264



AG681D

2. Place the spring slide and slide block (with spring in slide block) into position on the slide rail. Secure with a cap screw (coated with red Loctite #271) and washer. Tighten to 3.2 kg-m (23 ft-lb).

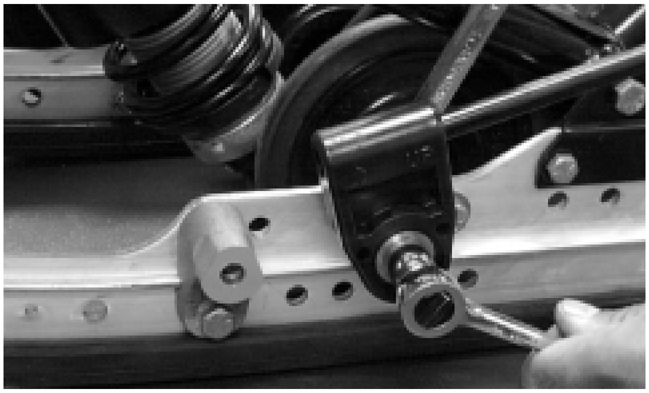
■ **NOTE: Make sure the spring is located above the spring slide mounting bolt.**

Fig. 9-265



AG680D

Fig. 9-266



AG679D

3. Install the front outer idler wheel; then secure with the cap screw, washer, and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

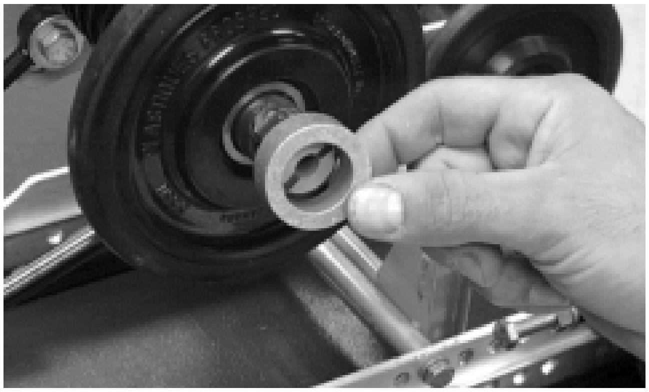
Fig. 9-267



AG678D

4. Install the spacer.

Fig. 9-268



AG677D

5. Install the rear upper idler wheel on the idler arm.

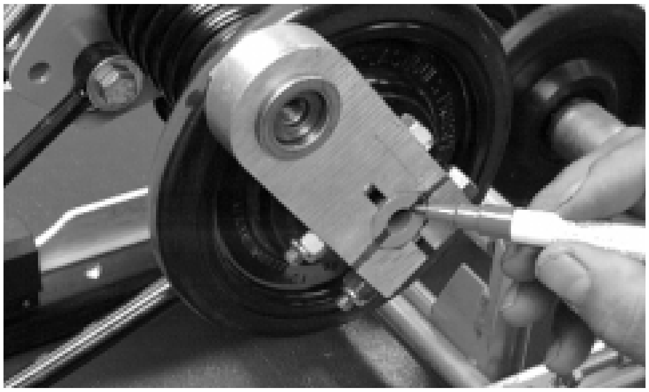
Fig. 9-269



AG545D

6. Making sure the marks made during disassembly are aligned, install the offset pivot idler to the idler arm and secure with the cap screws, washers, and lock nuts. Tighten to 2.6 kg-m (19 ft-lb).

Fig. 9-270

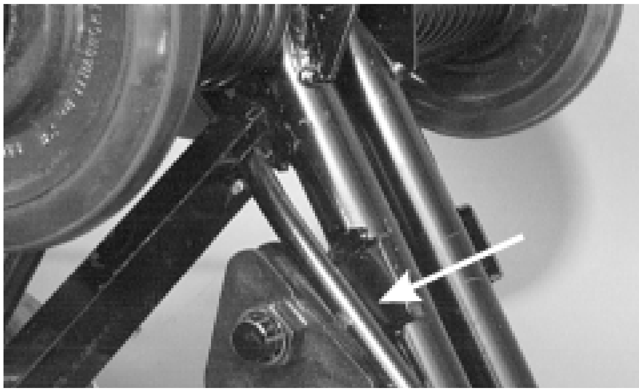


AG675D

7. Place the short spring leg onto the adjusting cam using the rear suspension spring tool.

9

Fig. 9-271



AG624DA

Rear Axle and Idler Wheels

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

1. Remove the insert from the idler wheel; then remove the cap screw and large flat washer securing the outer rear idler wheel. Remove the outer idler wheel from the shaft.

Fig. 9-272

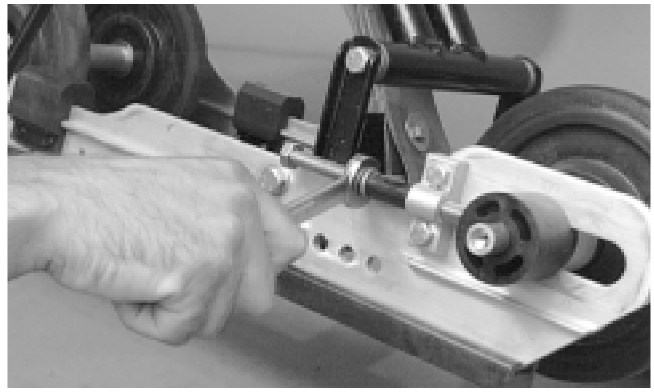


AG626D

■ **NOTE: The large flat side of the wheel insert is positioned next to the inner plastic adjuster bushing. The idler wheel must be installed with the wheel insert properly positioned.**

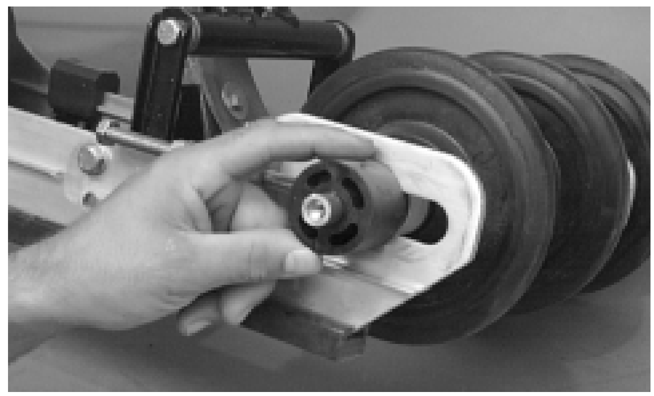
2. Loosen the track adjusting bolts. Slide the outer adjuster bushings off the axle.

Fig. 9-273



AG627D

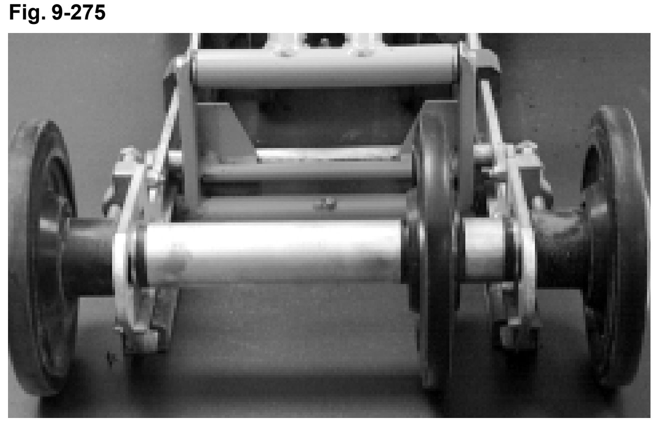
Fig. 9-274



AG628D

3. Carefully slide the shaft out from the inner idler wheels and note the position of the spacers and washers.

Fig. 9-275



AG805D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearings with a clean cloth.

2. Inspect all idler wheel inserts (inner and outer) for any cracks.

3. Inspect the outer rubber portion of the idler wheels for cracks and poor bonding.

4. Inspect the plastic insert of each idler wheel for cracks.

5. Inspect the shaft for wear and damaged threads.

6. Inspect all idler wheel bearings. Turn each bearing (by hand) and if any roughness or binding is noted, replace the bearing.

7. If a bearing must be replaced, use this procedure.

⚠ CAUTION

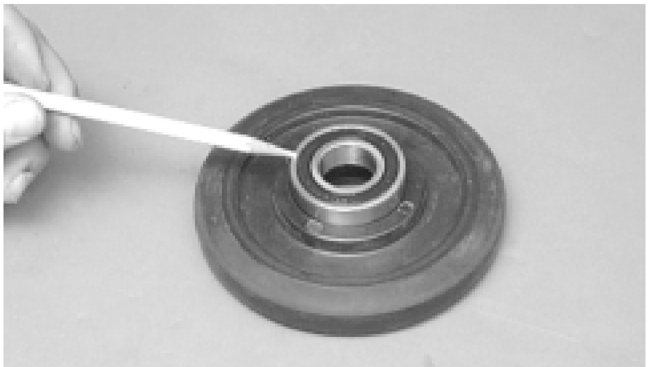
Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

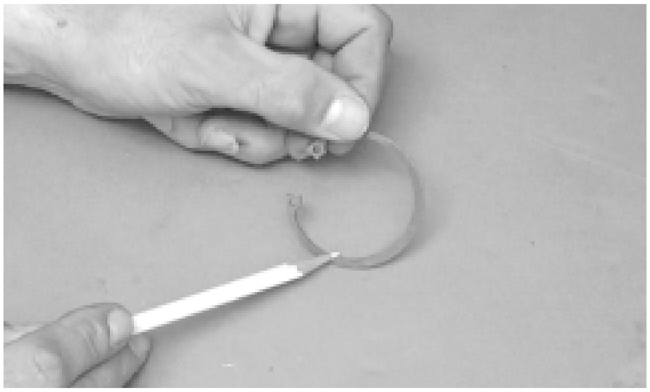
Fig. 9-276



AG538D

D. Install the snap ring making sure the "sharp side" is directed away from the bearing.

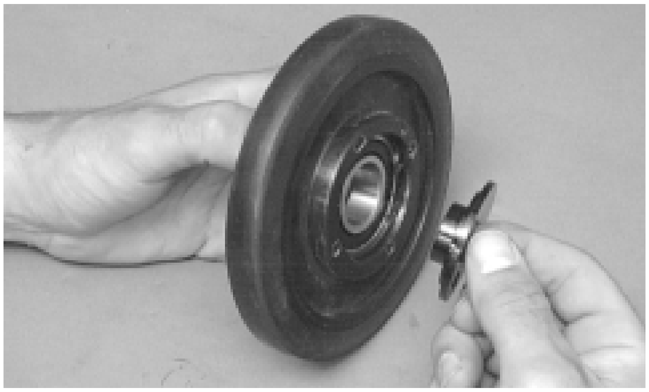
Fig. 9-277



AG539D

E. Install the insert.

Fig. 9-278

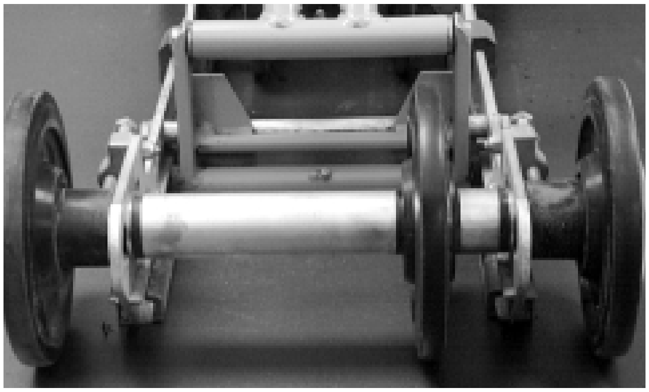


AG540D

ASSEMBLING

1. In order from the right-hand side, slide the axle through the slide rail axle bracket; then place a flat washer, short spacer with bushings, inner idler wheel with insert, long spacer with bushings, and flat washer on the axle. Slide the axle through the opposite slide rail axle bracket. Place the plastic adjuster bushings on the axle (on the outside of each axle bracket). Make sure the hole in the adjuster bushing is aligned directly with the adjusting bolt.

Fig. 9-279



AG805D

Fig. 9-280



AG551D

9

2. Place the outer idler wheels on the axle (with the large flat of the insert directed inward) and secure with two cap screws (coated with red Loctite #271) and large flat washers. Tighten cap screws to 3.2 kg-m (23 ft-lb); then install the inserts.

Fig. 9-281



AG626D

3. Adjust track alignment (see Track Alignment in this sub-section).
4. Adjust track tension deflection (see Track Tension in this sub-section).

Idler Arm

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

1. Remove the rear upper idler wheels and springs (see Rear Upper Idler Wheels/Rear Springs in this sub-section).

Fig. 9-282



AG545D

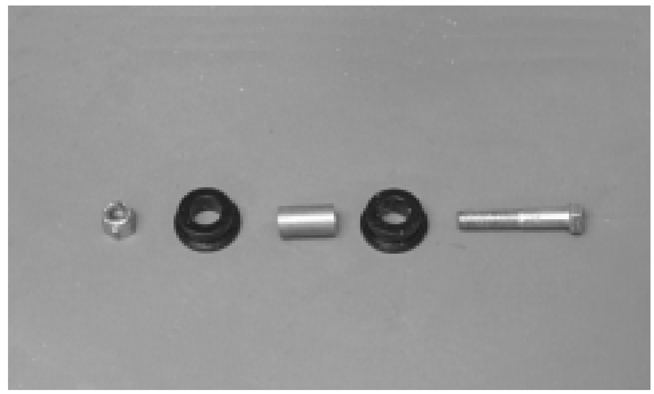
2. Remove the cap screw and lock nut securing the upper shock eyelet to the idler arm. Account for a spacer, lock nut, and bushings.

Fig. 9-283



AG467D

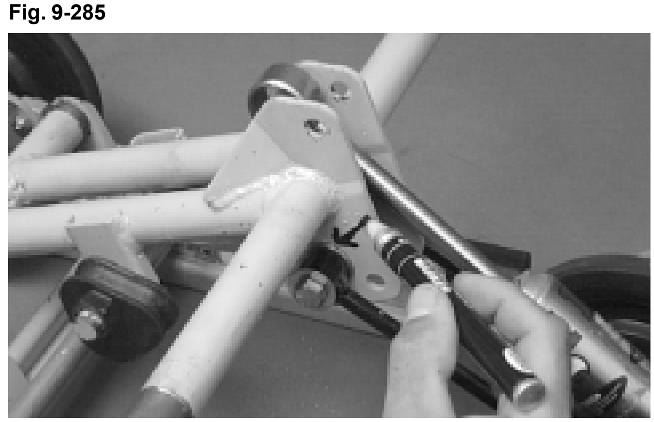
Fig. 9-284



AG553D

■ **NOTE: Mark the hole that the upper shock links are mounted in for assembly purposes.**

Fig. 9-285



AG554D

3. Remove the cap screw and lock nut securing the upper shock links to the idler arm. Account for a lock nut, spacer, flat washers, and axle links.

Fig. 9-286



AG682D

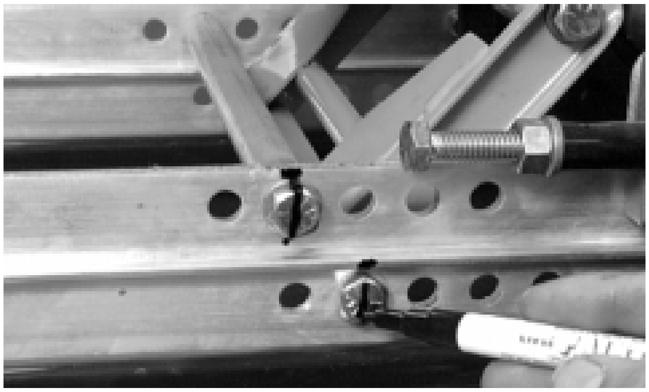
Fig. 9-287



AG556D

■ NOTE: Note the mounting hole from which the rear arm was removed for assembly purposes.

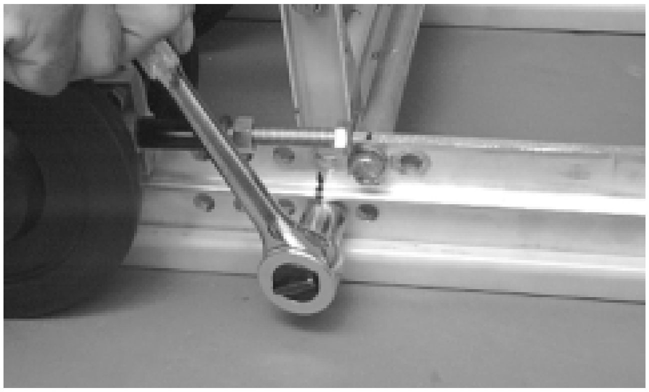
Fig. 9-288



AG683D

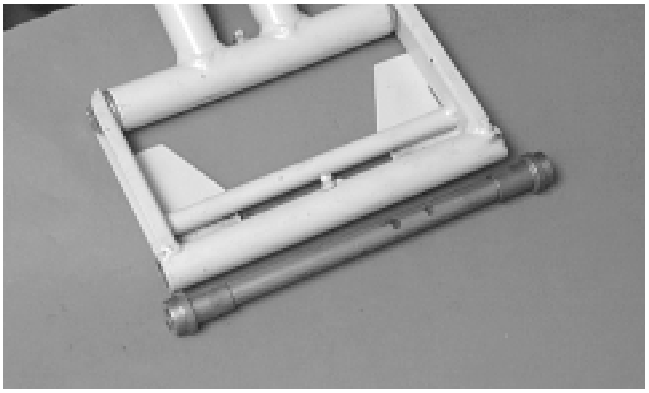
4. Remove the cap screw and lock nut securing the rear arm to the slide rail. Account for the serrated axles and axle tube.

Fig. 9-289



AG558D

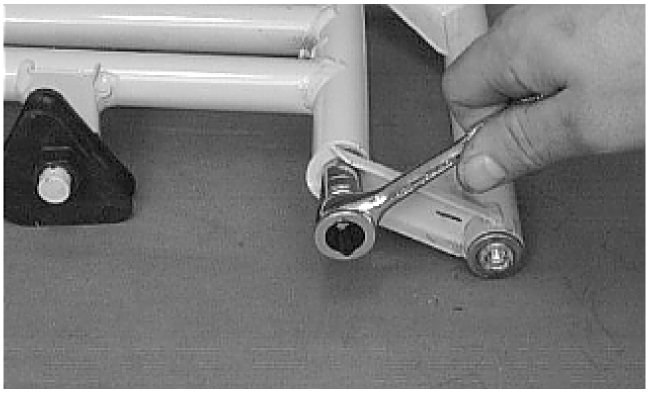
Fig. 9-290



AG560D

5. Remove the cap screw and lock nut securing the rear arm to the idler arm. Account for the aluminum axle and bushing assemblies.

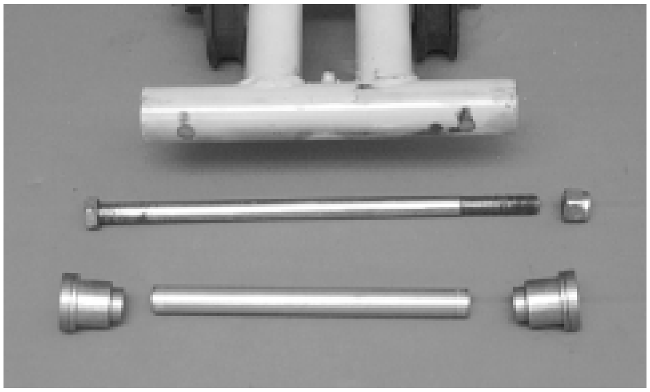
Fig. 9-291



AG477D

9

Fig. 9-292



AG561D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearings with a clean cloth.
2. Inspect each idler wheel for cracks or damage.
3. Inspect the bushings (located in the arm pivot area) for wear or damage.
4. Inspect all welds and the tubing of the upper arm for cracks or unusual bends.
5. Inspect the two adjusting cams for damage.
6. Rotate the idler wheel bearings (by hand) and check for binding or roughness.
7. If a bearing must be replaced, use this procedure.

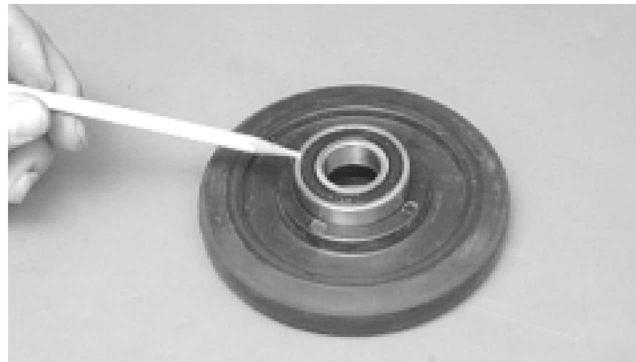
⚠ CAUTION
Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

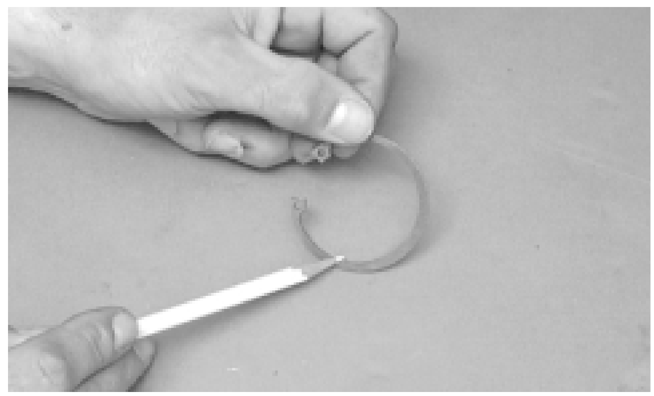
Fig. 9-293



AG538D

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.

Fig. 9-294



AG539D

E. Install the insert.

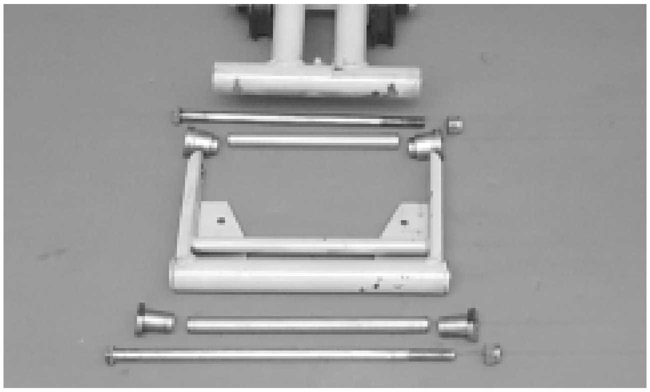
Fig. 9-295



AG540D

ASSEMBLING

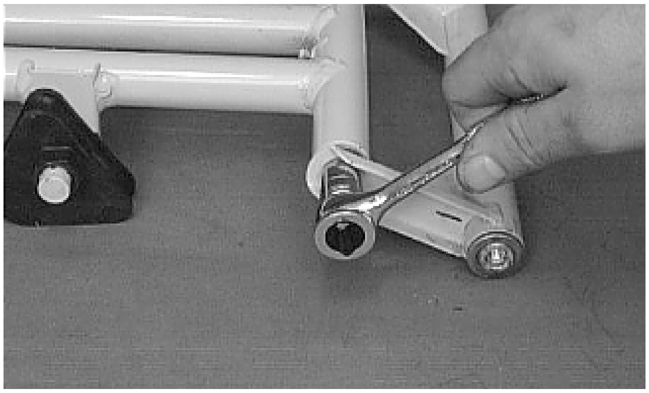
Fig. 9-296



AG562D

1. Install the rear arm onto the idler arm with an aluminum axle, bushing assemblies, cap screw, and a lock nut. Tighten to 3.2 kg-m (23 ft-lb).

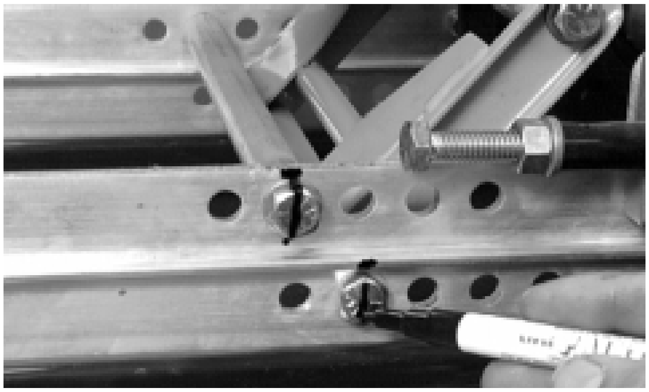
Fig. 9-297



AG477D

■ **NOTE: Install the rear arm assembly into the appropriate mounting hole as noted during disassembly.**

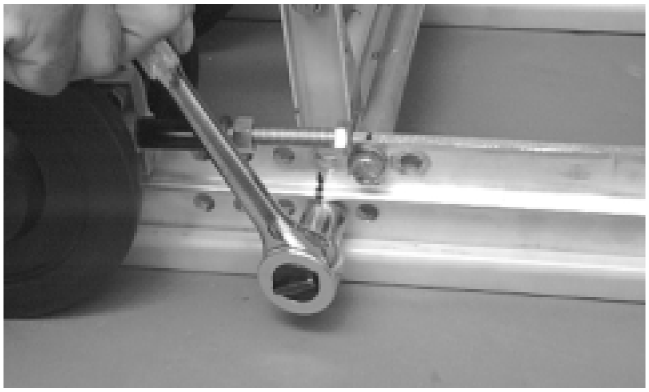
Fig. 9-298



AG683D

2. Place the rear arm assembly into position (with the brace facing towards the front). Secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-299



AG558D

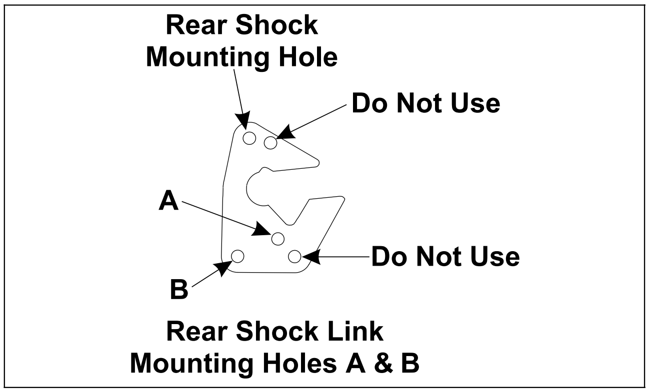
3. Position the shock links in the appropriate holes of the idler arm brackets (hole A). Place a spacer between the center of the brackets; then place a flat washer on the cap screw. Insert the axle links into the upper shock link eyelets; then insert the cap screw with washer through the eyelets. Secure with a cap screw, washer, and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-300



AG556D

Fig. 9-301



732-688F

9

Fig. 9-302



AG682D

4. Place the upper shock eyelet with bushings between the idler arm brackets making sure the spacer is properly positioned between the brackets. Secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-303



AG467D

■ **NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

5. Grease the idler arm and rear arm grease fittings with a low-temperature grease.

6. Install the rear upper idler wheels, rear springs, and offset pivot idler (see Rear Upper Idler Wheels/Rear Springs in this sub-section).

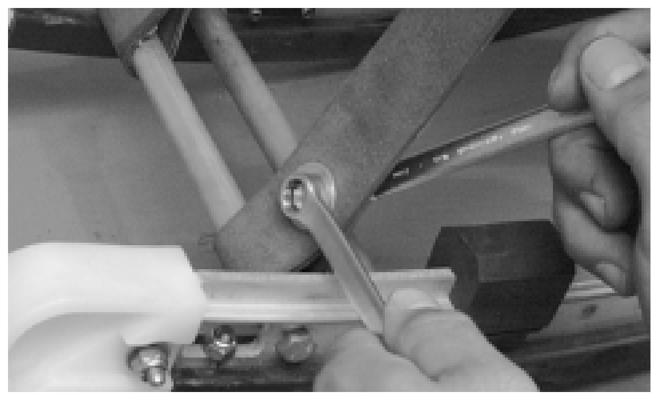
Front Arm/Front Shock Absorber/Front Inner Idler Wheels

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section), and the rear springs must be removed from the adjusting cams.**

REMOVING

1. Remove the lower cap screws and lock nuts securing the limiter straps to the rail support. Account for flat washers.

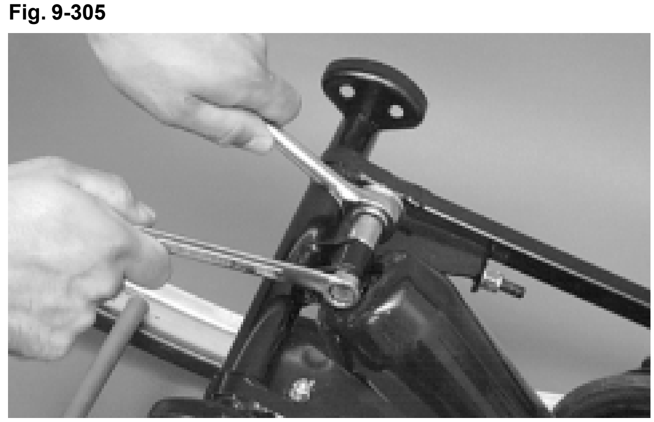
Fig. 9-304



AG632D

2. Remove the cap screw and lock nut securing the upper front shock absorber eyelet to the front arm. Pull the shock eyelet free of the bracket. Account for a serrated axle.

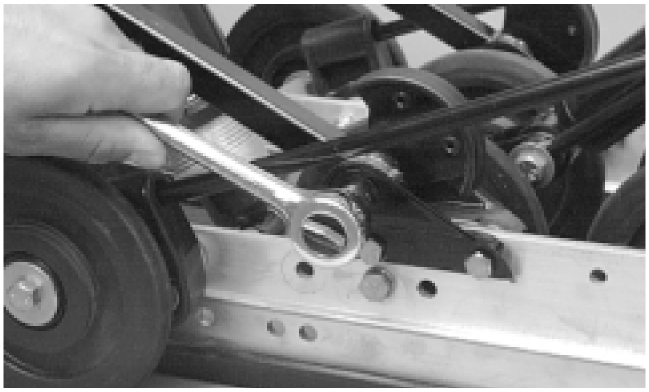
Fig. 9-305



AG582D

3. Remove the cap screw and lock nut securing the front arm to the front arm mounting brackets.

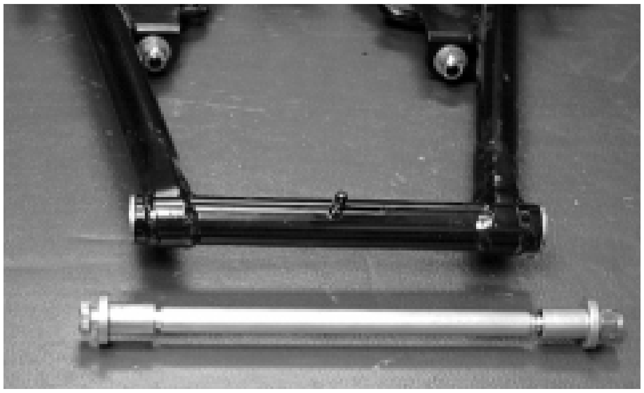
Fig. 9-306



AG633D

4. Remove the front arm and account for an axle tube and serrated axles.

Fig. 9-307



AG685D

5. Remove the cap screw securing the front inner idler wheels to the slide rails. Account for one small washer, two spacers, four large flat washers, a lock washer, and a lock nut.

Fig. 9-308



AG687D

Fig. 9-309



AG688D

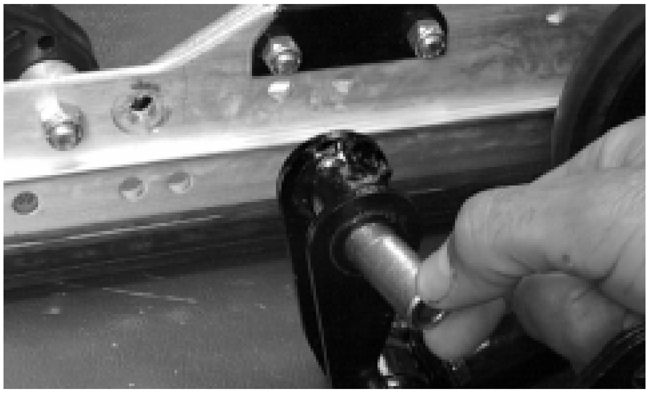
6. Remove the cap screw securing the front shock mounting bracket to the rear shock pivot. Account for an axle.

Fig. 9-310



AG689D

Fig. 9-311



AG690D

7. Remove the cap screw securing the front shock to the mounting bracket.

9

Fig. 9-312



AG691D

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

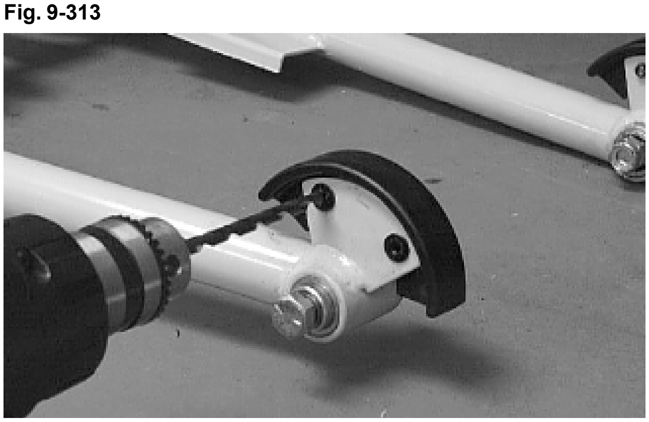
1. Inspect all front arm weldments for cracks or unusual bends.

2. Closely inspect all tubing for cracks or unusual bends.

3. Inspect the bearings, bushings, and front arm spacers for wear or damage.

4. Inspect the two rear track guide bumpers. If worn, drill out the rivets securing the bumpers to the arm and replace with new bumpers.

Fig. 9-313



AG486D

5. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.

6. Inspect the shock absorber eyelet welds (at each end) for any cracks, signs of separation, or for unthreading.

7. Inspect the shock absorber for damage.

INSTALLING

1. Secure the shock eyelet to the front shock mounting bracket. Tighten to 3.2 kg-m (23 ft-lb).

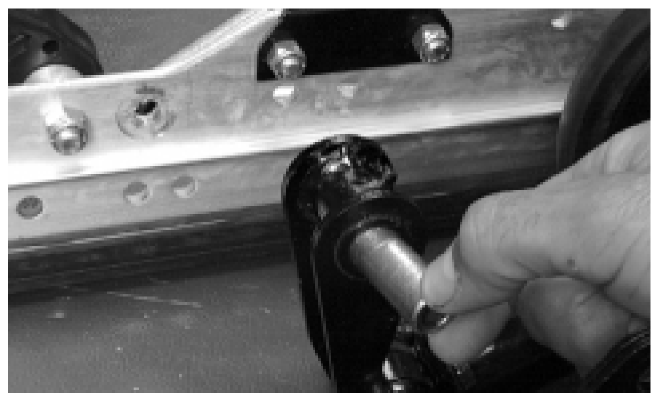
Fig. 9-314



AG691D

2. Secure the front shock mounting bracket and axle assembly to the rear shock pivot.

Fig. 9-315



AG690D

Fig. 9-316



AG689D

3. Slide the front idler wheel axle through the slide rail; then install a spacer, large washer, idler wheel, large washer, rear shock pivot, large washer, idler wheel, large washer, and a spacer.

Fig. 9-317

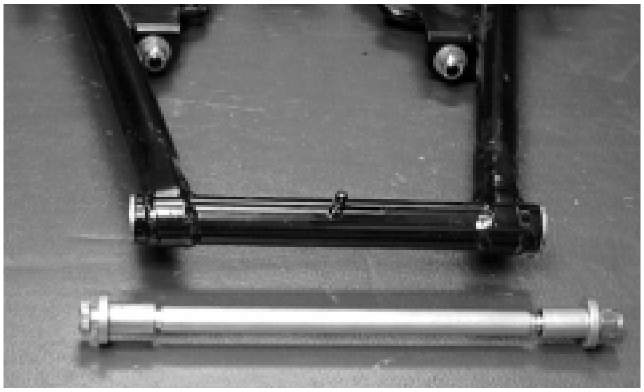


AG688D

4. Secure the front inner idler wheel assembly with a cap screw, flat washer, lock washer, and a lock nut. Tighten to 3.2 kg-m (23 ft-lb).

5. Position the front arm with spacers, an axle tube, and serrated axles to the mounting brackets. Secure with the cap screw and lock nut. Tighten to 4.2 kg-m (30 ft-lb).

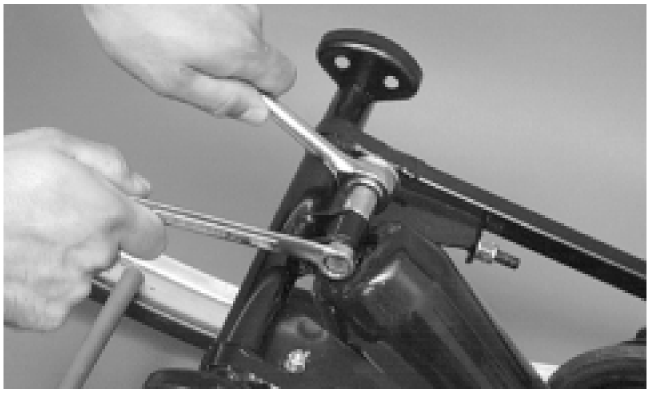
Fig. 9-318



AG685D

6. Position the upper shock eyelet and serrated axle in the front arm. Secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-319

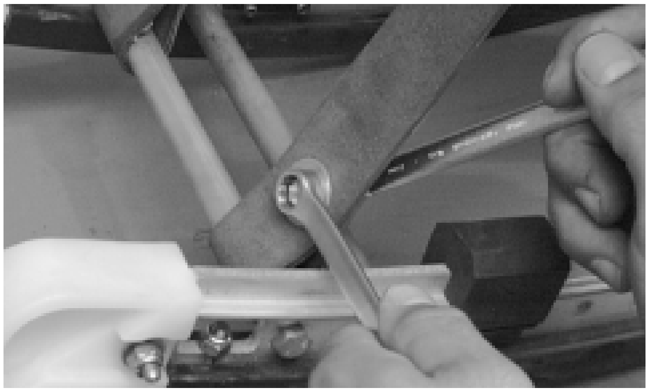


AG582D

■ **NOTE: Do not over-tighten the shock absorber cap screw as the shock eyelet must be free to pivot.**

7. Secure the limiter straps with cap screws, washers, and lock nuts. Tighten to 1.1 kg-m (8 ft-lb).

Fig. 9-320



AG632D

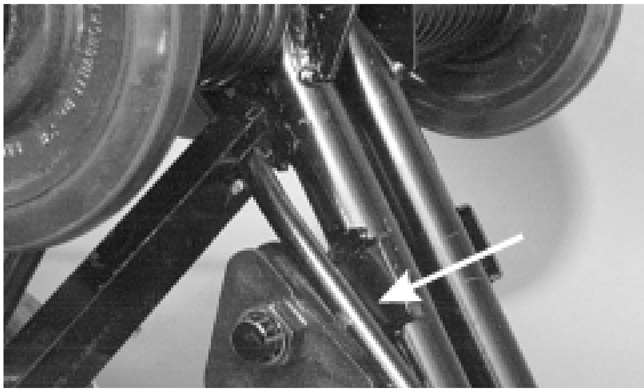
Rear Shock Absorber and Shock Links

■ **NOTE: The skid frame must be removed for this procedure (see Removing Skid Frame in this sub-section).**

DISASSEMBLING

1. Using the Rear Suspension Spring Tool (p/n 0144-311), remove the spring from the adjusting cam.

Fig. 9-321



AG624DA

⚠ WARNING

Care must be taken when removing the spring from the adjusting cam or damage or injury could result.

2. Remove the cap screw securing the lower shock eyelet and shock links. Account for shock sleeves, axle links, and a lock nut.

9

Fig. 9-322

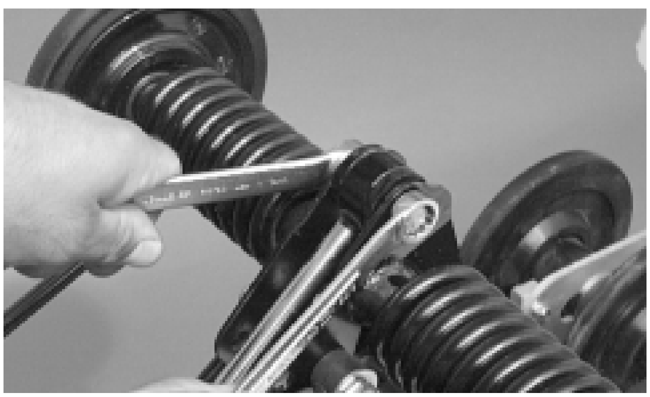


AG692D

■ **NOTE: Lay components out in order as they are removed.**

3. Remove the cap screw and lock nut securing the shock absorber at the upper eyelet and remove the shock absorber. Account for a sleeve and bushings.

Fig. 9-323



AG634D

4. Mark the hole that the upper shock links are mounted in for assembly purposes; then remove the cap screw and lock nut securing the shock links to the upper arm bracket. Account for all mounting hardware.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean shock pivot and idler wheel axle in part-cleaning solvent. Dry with compressed air.

⚠ WARNING

Always wear an approved pair of safety glasses when using compressed air.

2. Clean the idler wheel bearings with a clean cloth.

3. Closely inspect the idler wheel axle for wear, bends, or damaged threads at either end.

4. Inspect the idler wheels for signs of cracking, wear, or outer rubber separation from plastic wheel.

5. Rotate the idler wheel bearings (by hand) and inspect for any signs of binding or roughness.

6. If a bearing must be replaced, use this procedure.

⚠ CAUTION

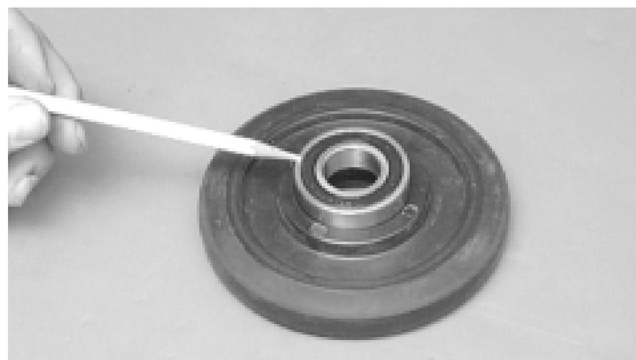
Do not remove the bearing unless it is absolutely necessary. The bearing will be damaged during removal.

A. Remove the wheel insert and the snap ring.

B. Using a hydraulic press, press the bearing out the inside of the wheel.

C. Press the new bearing (on its outer race) into the idler wheel.

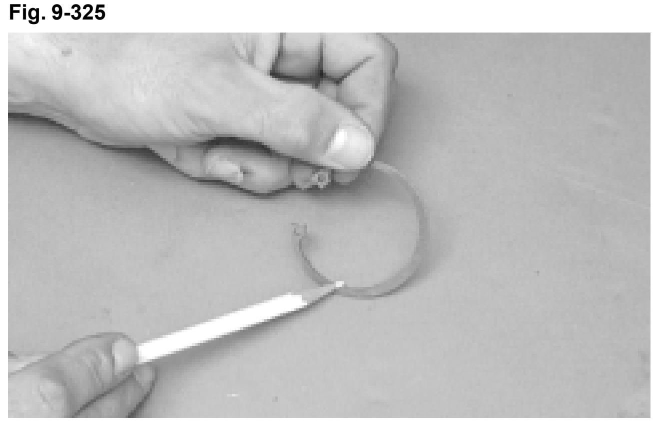
Fig. 9-324



AG538D

D. Install the snap ring making sure the “sharp side” is directed away from the bearing.

Fig. 9-325



AG539D

E. Install the insert.

7. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.

8. Inspect the rubber shock bushings located in the shock absorber eyelets for cracks or deterioration.

9. Inspect the shock absorber eyelet welds (at each end) for any cracks or signs of separation.

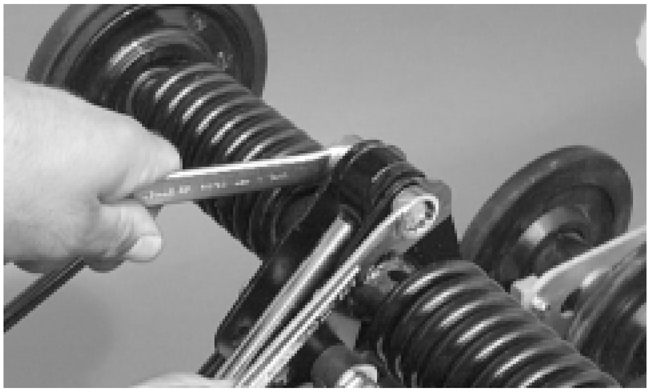
10. Inspect the welds securing the eyelets of the shock links for cracks or signs of separation. Either weld the eyelet or replace the shock link.

11. Inspect the axle surfaces for any signs of corrosion. If corrosion is found, lightly buff the surface of the axle with #400 wet-or-dry sandpaper; then apply a light coat of grease.

ASSEMBLING

1. Secure the shock eyelet to the idler arm with bushings, sleeve, lock nut, and a cap screw. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-326



AG634D

2. Secure the rear shock links and the lower shock absorber eyelet to the shock pivot bracket by placing the bushings and shock sleeve into the shock eyelet; then install the axle links into the rear shock links. Secure the assembly by installing a cap screw and thin flat washer through the shock link assembly, thick flat washer, shock pivot bracket and shock eyelet assembly, thick flat washer, shock link assembly, and a thin flat washer. Secure the assembly with a lock nut. Tighten to 3.2 kg-m (23 ft-lb).

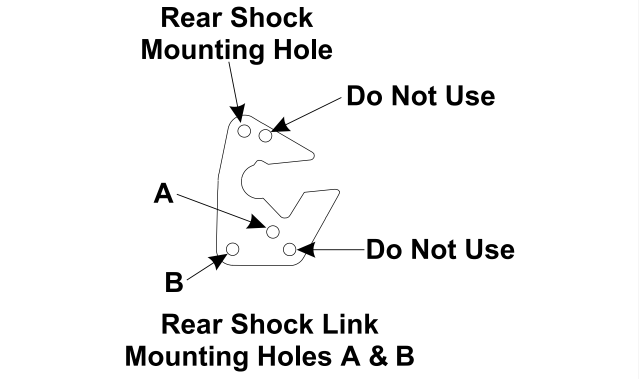
Fig. 9-327



AG692D

3. Position the shock links in the appropriate holes of the idler arm brackets (hole A). Place a spacer between the center of the brackets; then place a flat washer on the cap screw. Insert the axle links into the upper shock link eyelets; then insert the cap screw with washer through the eyelets. Secure with a cap screw, washer, and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-328



732-688F

Slide Rails

■ **NOTE: The skid frame must be removed for this procedure.**

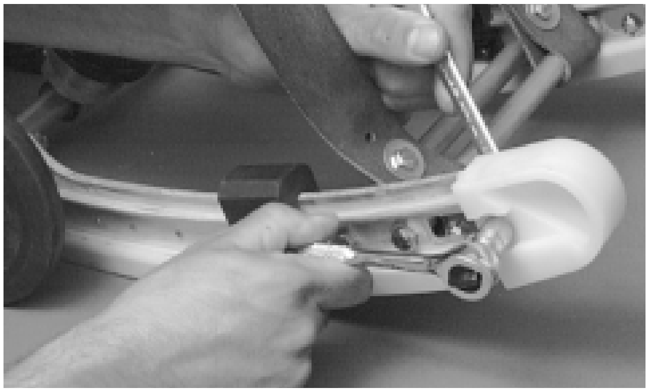
REMOVING

■ **NOTE: When it is necessary to replace one or both slide rails, it is recommended that one slide rail be removed at a time. The remaining slide rail will then hold the crossbraces, axles, and brackets in their correct assembly order. Always mark the mounting hole locations during disassembly to speed up the assembly process and to prevent any damage. This method is much quicker than to completely disassemble the entire skid frame. To replace either rail, use the following procedure.**

1. Remove the end cap from the slide rail. Account for a cap screw, lock nut, and two flat washers.

9

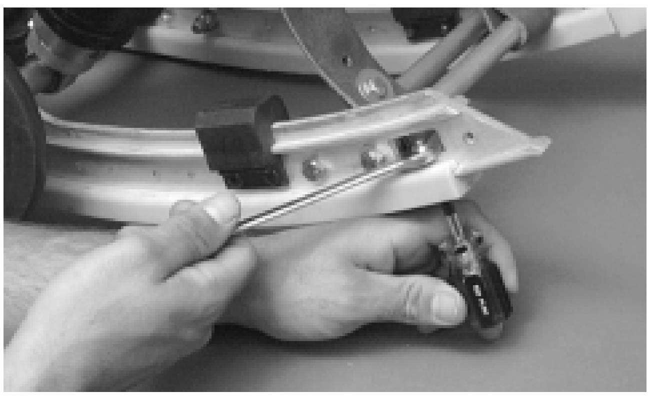
Fig. 9-329



AG506D

2. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail.

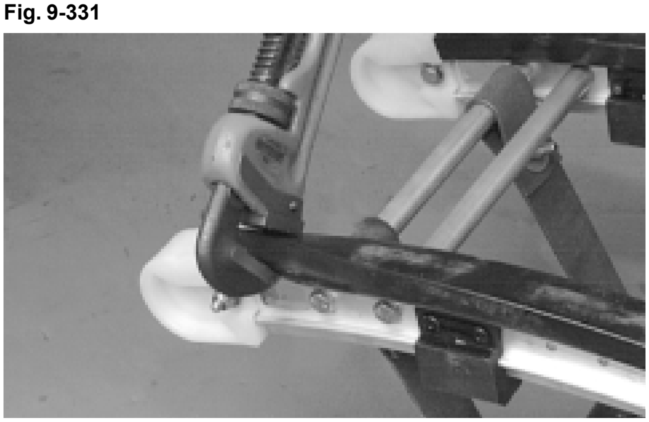
Fig. 9-330



AG509D

3. Using a pipe wrench and starting from either end, hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.

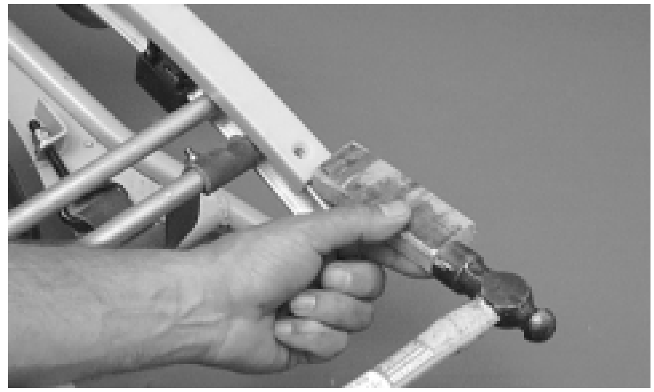
Fig. 9-331



AG617D

■ **NOTE: The wear strip can also be driven off the slide rail; however, it is quicker to use the pipe wrench.**

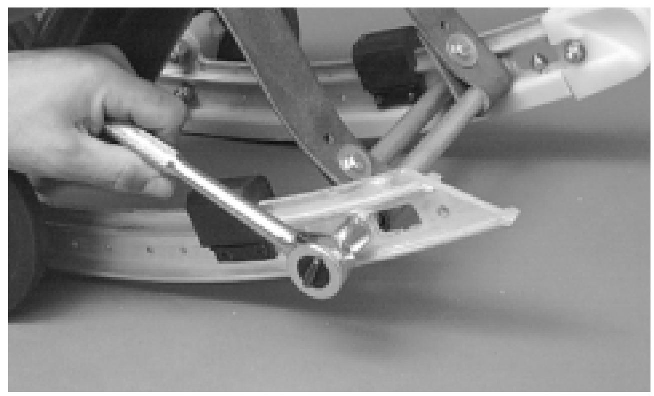
Fig. 9-332



AG510D

4. Remove the cap screws securing the crossbraces to the slide rail.

Fig. 9-333



AG511D

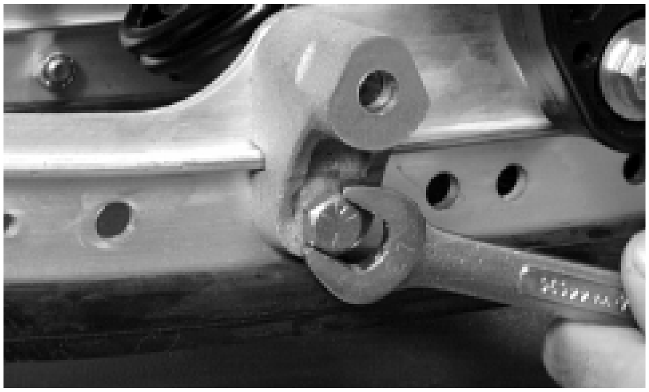
5. Remove the cap screws and lock nuts securing the front outer idler wheel and the idler wheel mounting block. Account for flat washers and an axle.

Fig. 9-334



AG678D

Fig. 9-335



AG686D

6. Remove the cap screw and lock washer securing the front inner idler wheel.

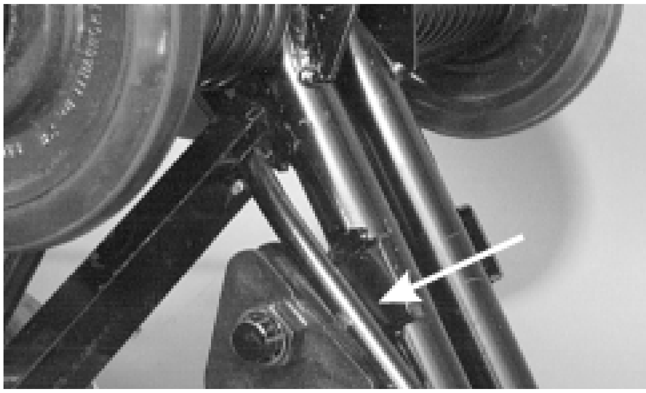
Fig. 9-336



AG687D

7. Remove the short spring leg from the adjusting cam.

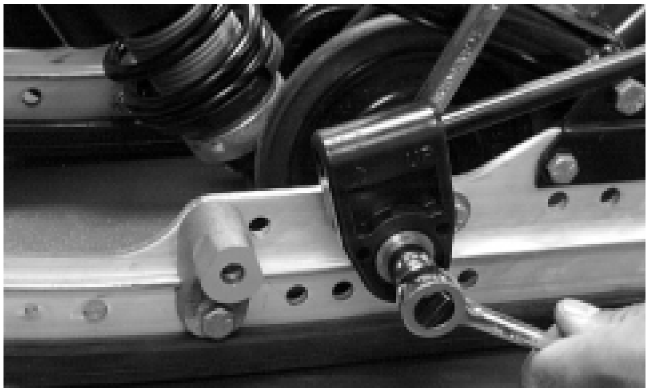
Fig. 9-337



AG624DA

8. Remove the cap screw and flat washer securing the spring slide to the rail. Account for a spacer and the slide block.

Fig. 9-338



AG679D

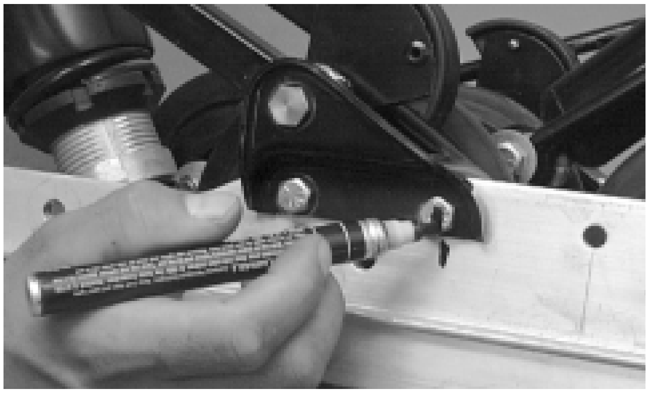
Fig. 9-339



AG680D

9. Mark the mounting position of the front arm mounting bracket.

Fig. 9-340



AG637D

10. Remove the cap screws securing the front arm mounting bracket. Account for lock nuts.

9

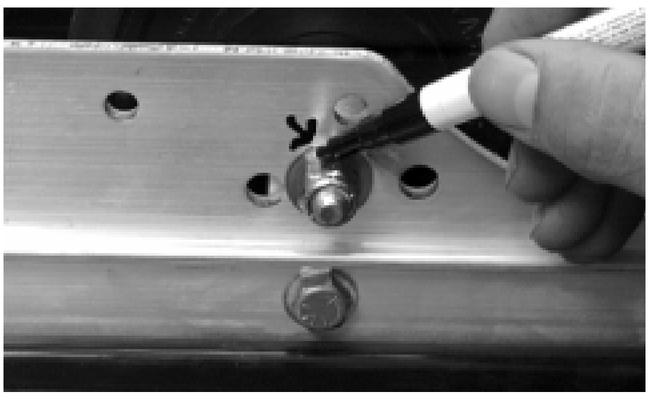
Fig. 9-341



AG638D

11. Mark the mounting position of the rear inner idler wheels.

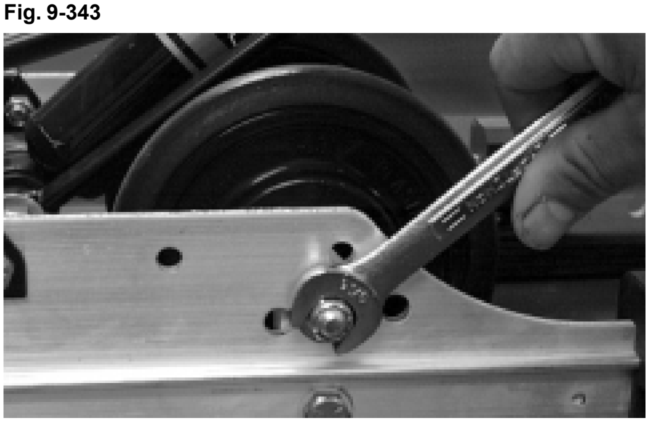
Fig. 9-342



AG693D

12. Remove the cap screws and lock nut securing the rear inner idler wheels and mounting block.

Fig. 9-343



AG672D

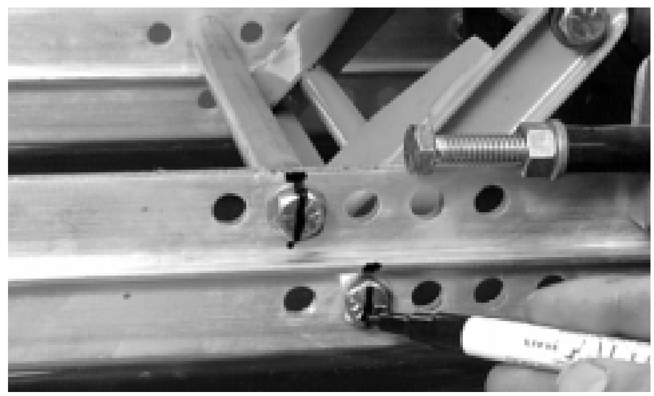
Fig. 9-344



AG673D

13. Mark the mounting position of the rear arm limiter and rear arm.

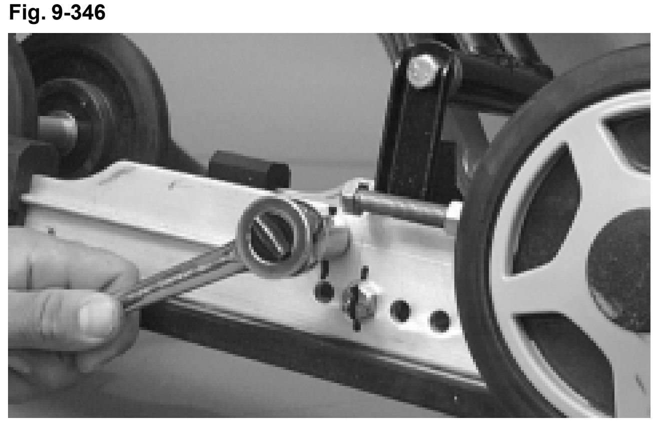
Fig. 9-345



AG683D

14. Remove the cap screw, lock washer, and lock nut from the rear arm limiter shaft.

Fig. 9-346



AG639D

15. Remove the cap screw and lock nut securing the rear arm to the rail.

Fig. 9-347



AG694D

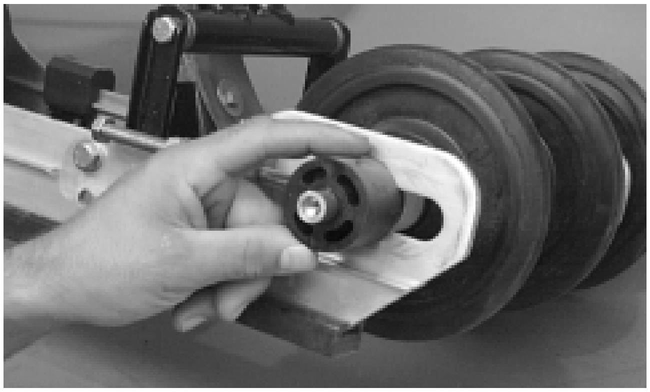
16. Remove the idler wheel insert; then remove the cap screw and flat washer securing the rear idler wheel. Remove the idler wheel; then remove the adjuster bushing.

Fig. 9-348



AG626D

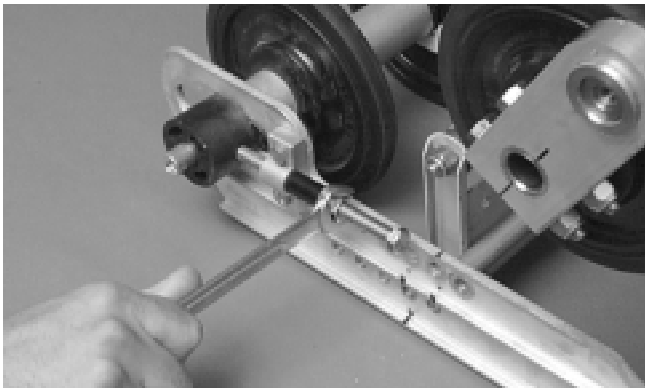
Fig. 9-349



AG628D

■ **NOTE: The adjusting bolt may have to be loosened to remove the adjuster bushing.**

Fig. 9-350

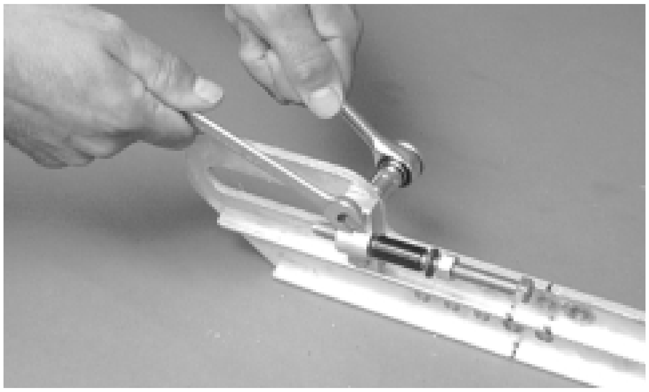


AG525D

■ **NOTE: At this point, the slide rail should be free of the skid frame components and can be removed.**

17. Remove the cap screws and lock nuts securing the track adjuster bracket.

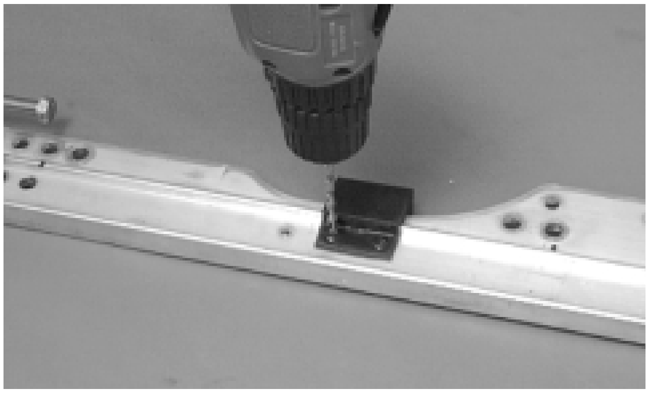
Fig. 9-351



AG527D

18. Using a drill and a 3/16-in. drill bit, drill out the rivets and remove the shock pads. Note the shock pad location for installation. Account for the retaining brackets.

Fig. 9-352



AG528D

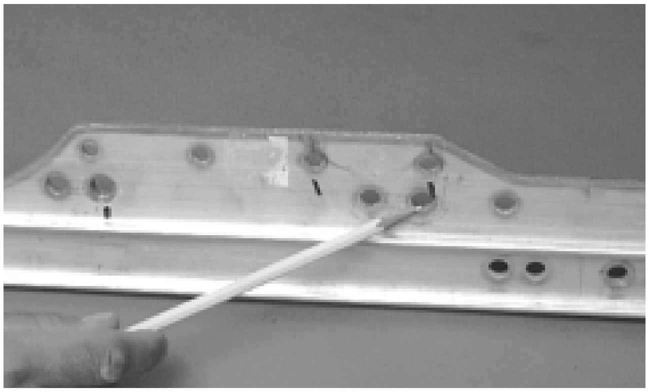
9

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the slide rail for cracks or unusual bends.

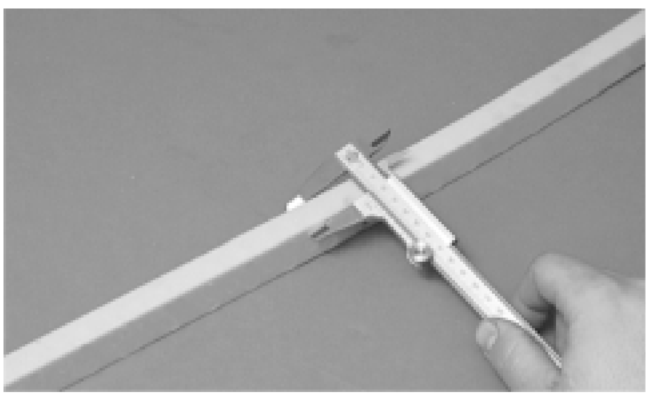
Fig. 9-353



AG529D

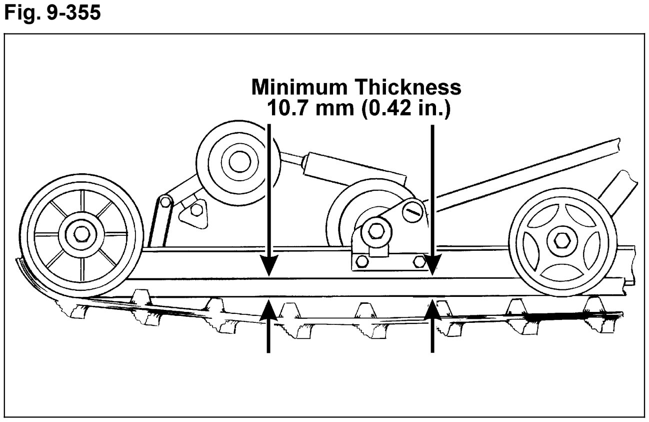
2. Inspect the wear strip for wear. The wear strip must be 10.7 mm (0.42 in.) thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.

Fig. 9-354



AG530D

Fig. 9-355

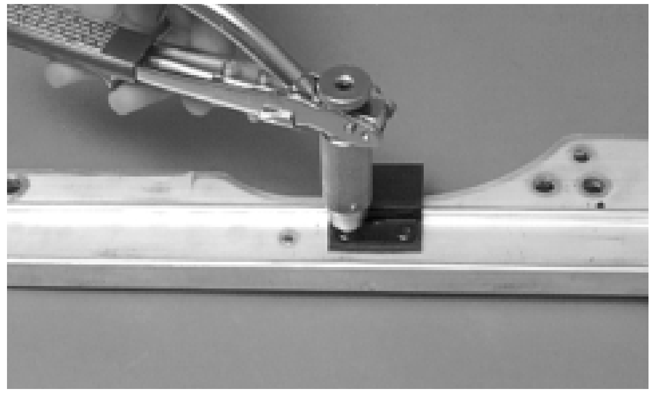


0727-726

INSTALLING

1. Install the shock pads and retaining brackets; then secure with rivets.

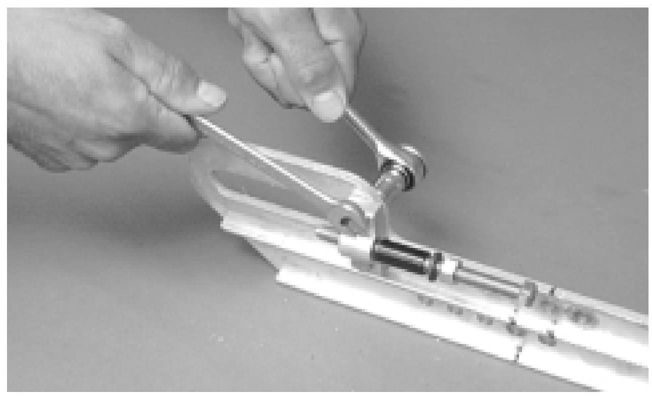
Fig. 9-356



AG531D

2. Secure the track adjuster bracket with the cap screws and lock nuts. Tighten to 1.5 kg-m (11 ft-lb).

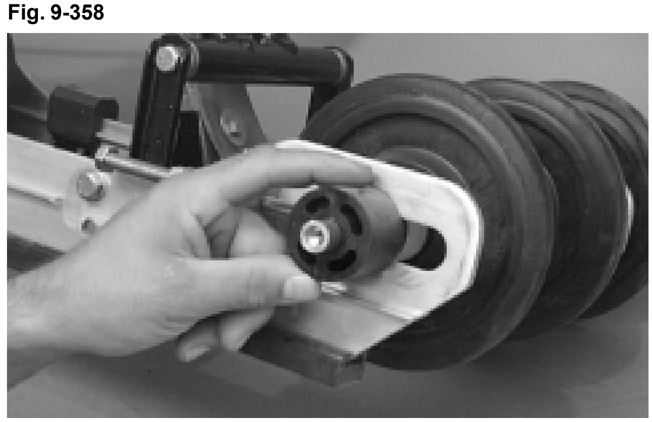
Fig. 9-357



AG527D

3. Place the rail into position; then install the adjuster bushing and rear idler wheel. Secure with a cap screw (coated with red Loctite #271) and flat washer. Tighten to 3.2 kg-m (23 ft-lb); then install the wheel insert.

Fig. 9-358



AG628D

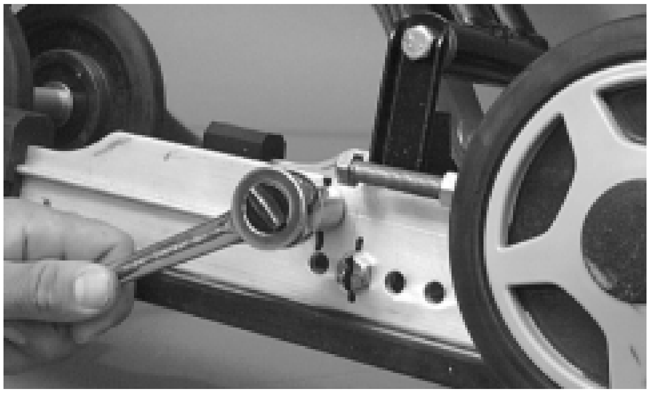
Fig. 9-359



AG626D

4. Install the rear arm limiter cap screw (coated with red Loctite #271) in the appropriate hole (as noted during disassembly) and tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-360



AG639D

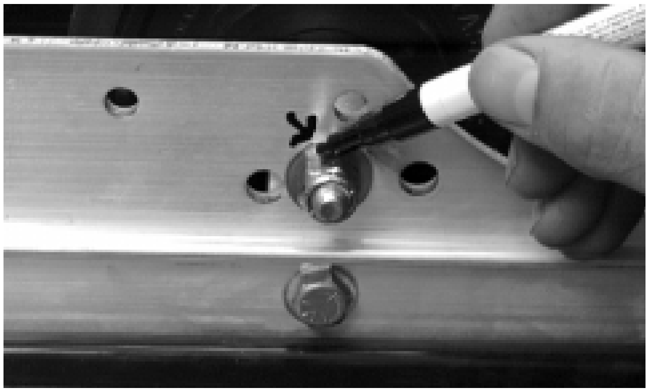
5. Install the rear inner idler wheels in the appropriate hole as noted during disassembly and secure with cap screws (coated with red Loctite #271) and lock nuts. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-361



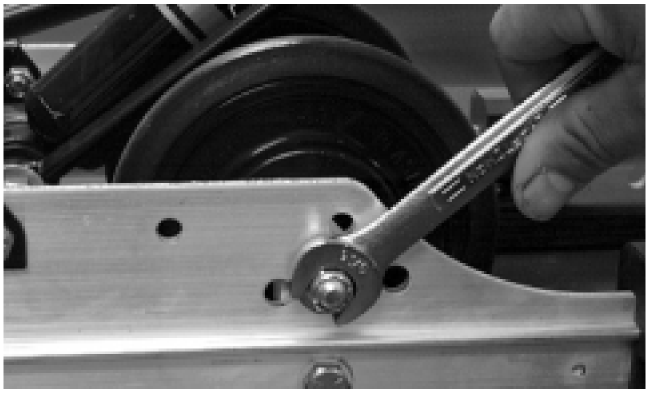
AG673D

Fig. 9-362



AG693D

Fig. 9-363



AG672D

6. Secure the front arm mounting bracket with the cap screws (coated with red Loctite #271) and lock nuts. Tighten to 2.4 kg-m (17 ft-lb).

Fig. 9-364



AG638D

7. Place the spring into the slide blocks; then place the spring slide and slide block assembly into position on the slide rail. Secure with a cap screw (coated with red Loctite #271) and washer. Tighten to 3.2 kg-m (23 ft-lb).

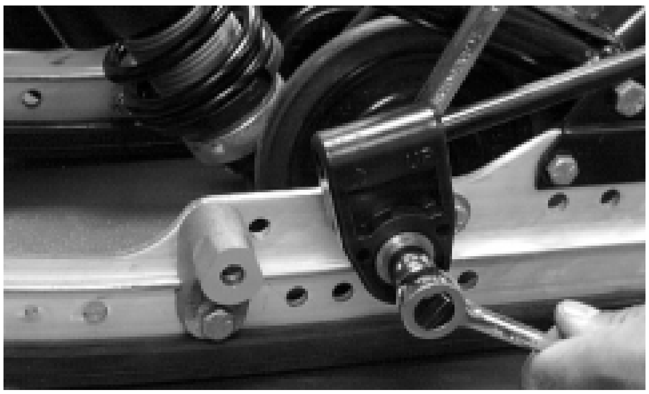
9

Fig. 9-365



AG680D

Fig. 9-366



AG679D

8. Secure the front inner idler wheel axle with a cap screw (coated with green Loctite #609) and lock washer. Tighten to 3.2 kg-m (23 ft-lb).

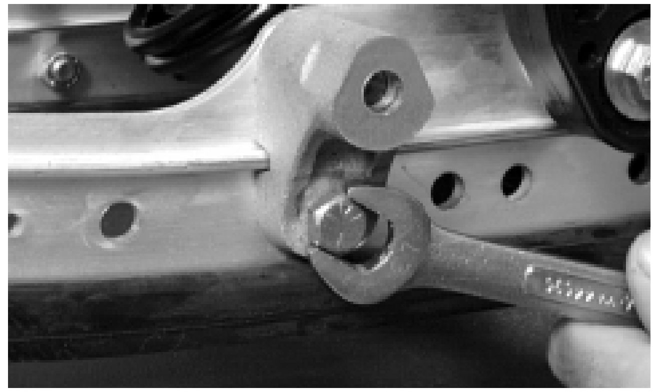
Fig. 9-367



AG687D

9. Secure the outer idler wheel mounting block with the cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-368



AG686D

10. Secure the outer idler wheel to the mounting block with a cap screw, flat washers, idler wheel, axle, and a lock nut. Tighten to 3.2 kg-m (23 ft-lb).

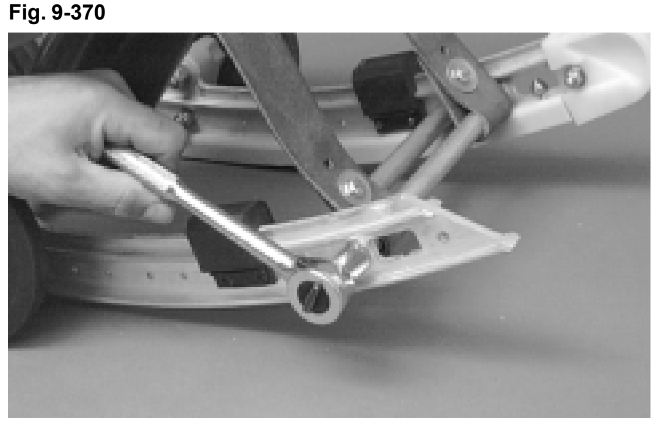
Fig. 9-369



AG678D

11. Secure the crossbraces with cap screws (coated with red Loctite #271). Tighten to 1.5 kg-m (11 ft-lb).

Fig. 9-370



AG511D

12. Install the rear arm in the appropriate hole as noted during disassembly; then secure with a cap screw (coated with red Loctite #271) and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

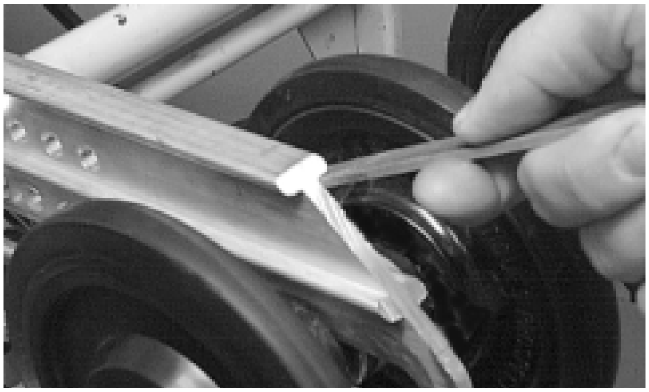
Fig. 9-371



AG694D

■ **NOTE: Apply a light coat of grease to the slide rail surface to aid in installing a new wear strip. If there are any sharp edges on the lower portion of the rail, use a file to remove them.**

Fig. 9-372



AG534D

13. From the back, start the wear strip onto the rail; then using a block of wood and a hammer, drive the wear strip forward into position. Secure with a machine screw and lock nut. Tighten to 1.1 kg-m (8 ft-lb).

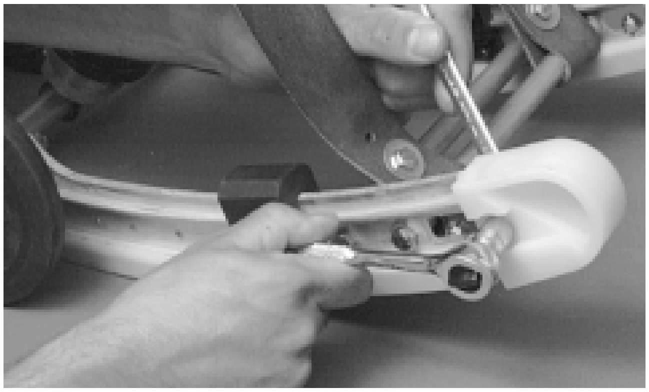
Fig. 9-373



AG509D

14. Secure the end cap onto the slide rail using a cap screw, flat washers, and a lock nut. Tighten to 1.1 kg-m (8 ft-lb).

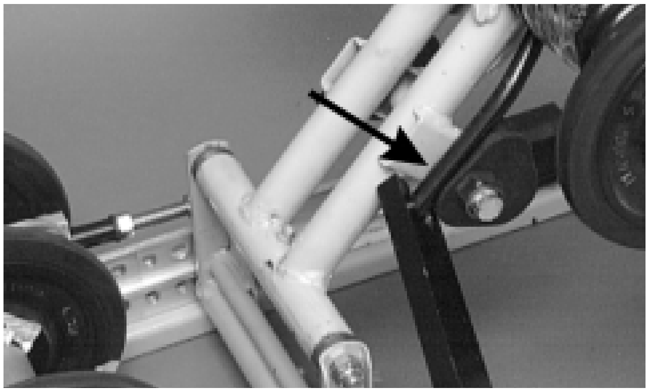
Fig. 9-374



AG506D

15. Install the short spring leg onto the adjusting cam.

Fig. 9-375



AG516DA

16. Adjust suspension.

17. After the skid frame has been installed, adjust track tension deflection (see Track Tension in this sub-section) and track alignment (see Track Alignment in this sub-section).

Installing Skid Frame

1. Place a piece of cardboard on the floor to protect against scratching and tip the snowmobile onto one side.

2. Pull the track away from the tunnel and spread open; then place the skid frame into the track.

3. Position the front of the skid frame into the tunnel and align the front arm with the appropriate mounting hole in the tunnel. Insert the cap screw with washers through the tunnel mounting hole and through the front arm. DO NOT TIGHTEN AT THIS TIME. Repeat this procedure on the other side.

■ **NOTE: To aid in centering the front arm with the hole in the tunnel, position the skid frame and track at a 45° angle to the bottom of the tunnel.**

4. Elevate the rear of the skid frame and the track into position in the tunnel.

5. Align the offset pivot idler arm assembly with the appropriate hole in the tunnel. Secure the offset pivot idler arm assembly with a cap screw (coated with red Loctite #271), lock washer, and flat washer. DO NOT TIGHTEN AT THIS TIME.

■ **NOTE: Do not install the short legs of the rear springs onto the adjusting cams at this time.**

6. At this time, tighten all four skid frame mounting cap screws to 3.2 kg-m (23 ft-lb).

7. Using the Rear Suspension Spring Tool (p/n 0144-311), install the short legs of the rear springs onto the adjusting cams making sure the cams are in the same adjustment positions.

8. Tighten the two track tension adjusting bolt evenly until track deflection is within specifications; then lock the jam nuts to secure the adjustment.

9. Check track tension deflection and alignment; adjust if necessary (see Track Tension and Track Alignment in this sub-section).

Track Tension

⚠ WARNING

Deactivate all switches.

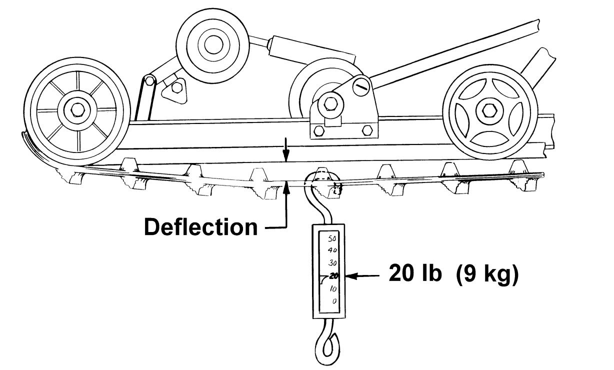
CHECKING DEFLECTION

1. Tip the snowmobile on its side.

2. Hook a spring scale around a track clip at mid-span; then pull the track down with the scale to 9 kg (20 lb) and measure the distance between the bottom of the wear strip and the inside surface of the track. Track deflection must be within specifications.

Rear Suspension Style	Setup Tension	After Break-In Tension
FasTrack w/o Torque Sensing Link	19-25 mm (3/4-1 in.)	25-32 mm (1-1 1/4 in.)
FasTrack w/Torque Sensing Link (121 in. Track)	32-38 mm 1 1/4-1 1/2 in.)	38-44 mm (1 1/2-1 3/4 in.)
FasTrack w/Torque Sensing Link (136 in. Track)	38-44 mm (1 1/2-1 3/4 in.)	50.8-57.2 mm (2-2 1/4 in.)

Fig. 9-376



729-429A

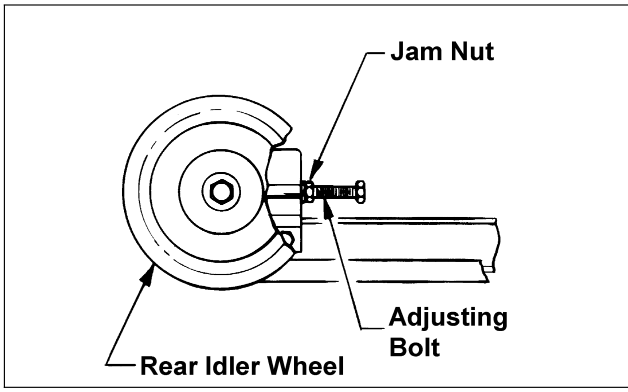
■ **NOTE: If the track is new, it will stretch slightly and take a "set" within the first 300 to 500 miles of operation.**

ADJUSTING DEFLECTION

1. Place the snowmobile up on a shielded safety stand. Check to make sure the track is 2-3 in. off the floor.

2. If the measurement is not as specified, loosen the jam nuts of the adjusting bolts.

Fig. 9-377



0727-456

3. If the measurement obtained in step 2 is more than specified, tighten the adjusting bolts. If the measurement obtained is less than specified, loosen the adjusting bolts. When the measurement is within specification range, lock the adjustment by bottoming the jam nuts against the axle housings.

■ **NOTE: Vigorously push the underside of the track up and down. Track must not hit the top of the tunnel or slap the skid frame.**

4. After correct track tension is obtained, check track alignment (see Track Alignment in this sub-section).

■ **NOTE: Track tension and track alignment are interrelated; always check both even if only one adjustment seems necessary. Always establish correct track tension before checking and/or adjusting alignment.**

Track Alignment

■ **NOTE: Proper track alignment is when the rear idler wheels are equidistant from the inner drive lugs on the inside surface of the track.**

CHECKING

1. Using a shielded safety stand, raise the rear of the snowmobile off the floor making sure the track is free to rotate.

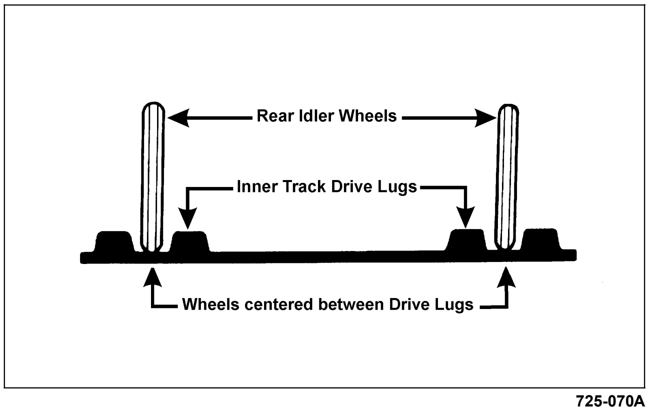
> **⚠ WARNING**
>
> **The tips of the skis must be positioned against a wall or similar object for safety. Keep hands, feet, and clothing away from moving components.**

2. Start the engine and accelerate slightly. Use only enough throttle to rotate the track several revolutions. SHUT THE ENGINE OFF.

■ **NOTE: Allow the track to coast to a stop. Do not apply the brake because it could produce inaccurate alignment conditions.**

3. When the track stops rotating, check the relationship of the rear idler wheels and the inner track drive lugs. If the distance from the idler wheels to the inner drive lugs is the same on both sides, no adjustment is necessary.

Fig. 9-378



4. On the side of the track, which has the inner drive lugs closer to the rear idler wheel, loosen the adjusting bolt jam nut; then rotate the adjusting bolt clockwise 1-1 1/2 turns.

5. Continue to check the track alignment and make the necessary adjustments until proper alignment is obtained.

6. After proper track alignment is obtained, lock the jam nut against the axle housing.

■ **NOTE: Make sure correct track tension is maintained after adjusting track alignment.**

■ **NOTE: Field test the track under actual conditions and after the field test, check track alignment and track tension; adjust as necessary.**

9

Repair Procedure 3 - Track/Rear Suspension

This Track/Rear Suspension sub-section (Repair Procedure 3) has been organized so each procedure can be completed individually and efficiently. Each sub-section has (as necessary) Removing, Disassembling, Cleaning and Inspecting, Assembling, and Installing procedures.

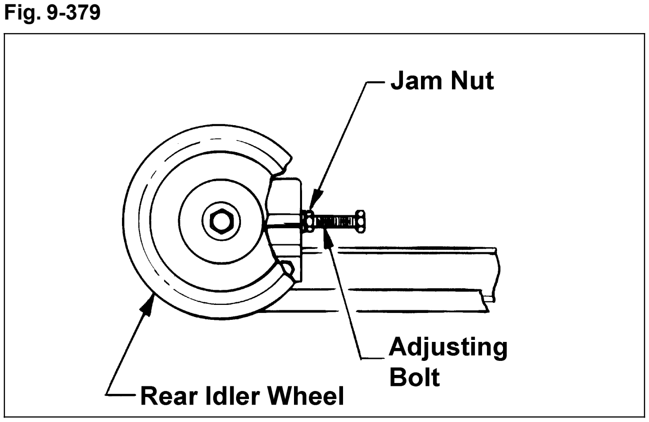
■ **NOTE: Some photographs used in this sub-section are used for clarity purposes only and are not designed to depict actual conditions.**

Removing Skid Frame

■ **NOTE: Many service procedures can be performed without removing the skid frame. Closely observe the note introducing each subsequent sub-section for this important information.**

1. Loosen the jam nuts and the two track tension adjusting bolts.

Fig. 9-379



2. Place a support stand under the rear bumper; then remove the four cap screws securing the skid frame to the tunnel.

■ **NOTE: The support stand should hold the snowmobile level and not raised off the floor.**

3. Remove the support stand; then tip the snowmobile onto one side using a piece of cardboard to protect against scratching. Remove the skid frame.

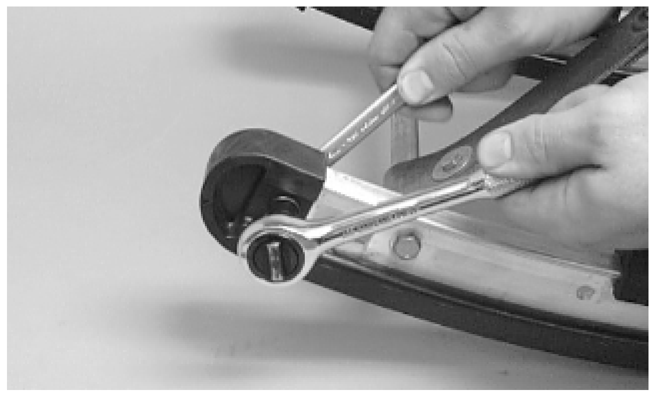
End Cap

■ **NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

1. Remove the lock nut, washer, and cap screw securing the end cap.

Fig. 9-380



AG297D

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the end cap area of the slide rail for cracks and wear.
2. Inspect the end cap for any signs of cracking or wear.
3. Clean both the slide rail area and the end cap. Using compressed air, clean the areas of dirt and gravel.

> **⚠ WARNING**
>
> **Always wear safety glasses when using compressed air.**

4. Inspect the cap screw for cracked, stretched, or damaged threads. Use a new lock nut when assembling.

INSTALLING

1. Position the end cap on the slide rail; then align the hole in the end cap with the hole in the slide rail.
2. Secure with a cap screw and new lock nut. Tighten to 1.1 kg-m (8 ft-lb).

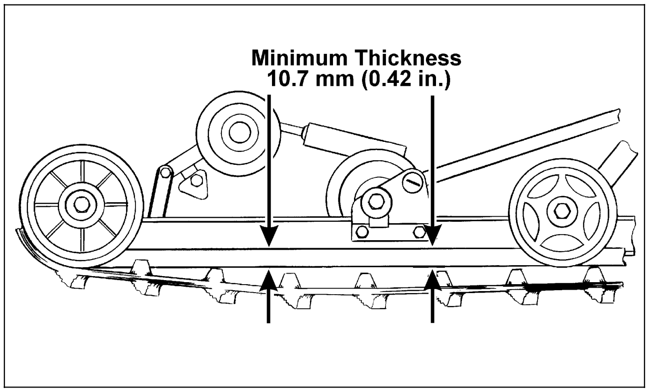
Wear Strip

■ NOTE: The skid frame should be removed for this procedure.

REMOVING

■ NOTE: Prior to removing the wear strips, inspect each wear strip for wear. The wear strip must be 10.7 mm (0.42 in.) thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.

Fig. 9-381

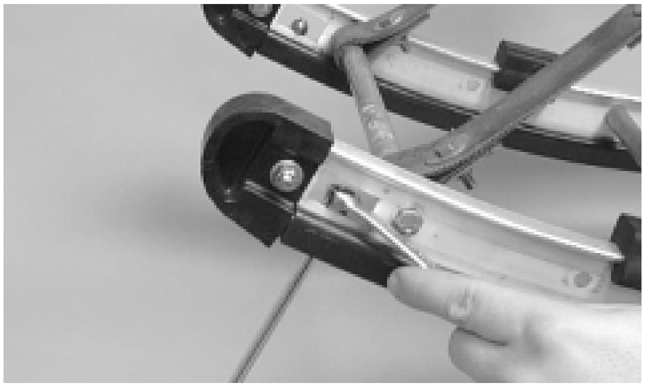


0727-726

■ NOTE: It is possible to remove and install a wear strip without removing the skid frame. To do this, remove the machine screw and lock nut securing the wear strip at the front of the slide rail; then align the wear strip with openings (windows) in the track and drive it rearward off the slide rail. Apply low-temperature grease to the new wear strip and slide rail; then align the wear strip with openings (windows) in the track and drive it forward onto the slide rail. Secure with the machine screw and lock nut tightened to 1.1 kg-m (8 ft-lb).

1. Remove the machine screw and lock nut securing the wear strip to the front of the slide rail.

Fig. 9-382



AG298D

2. Using a pipe wrench and starting from either end, hook the edge of the wear strip with the pipe wrench jaw and twist the wear strip off the slide rail. Move the pipe wrench 7.5 cm (3 in.) and again twist the wear strip off the rail. Repeat this procedure until the wear strip is free of the rail.

Fig. 9-383



AG299

■ NOTE: The wear strip can also be driven off the slide rail; however, it is quicker to use a pipe wrench.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the slide rail using parts-cleaning solvent and compressed air.

⚠ WARNING

Always wear safety glasses while using compressed air.

2. Inspect the slide rail for cracks. If any cracks are found, replace the slide rail.

3. Using a straightedge, inspect the slide rail for any unusual bends. Place the straightedge along the bottom surface of the slide rail. If the rail is found to be bent, it must be replaced.

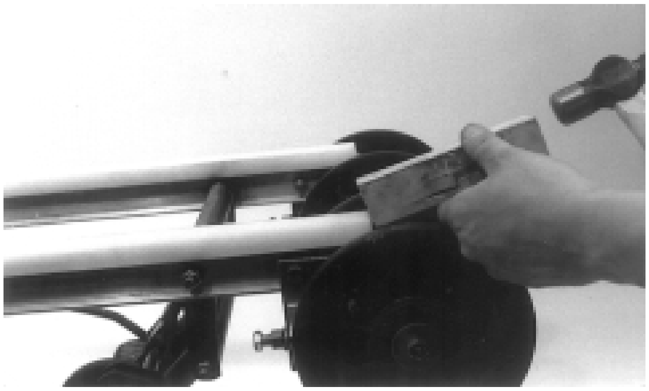
4. Place the straightedge along the side of the slide rail. If rail is found to be bent, it must be replaced.

INSTALLING

■ NOTE: Apply a light coat of grease to the slide rail surface to aid in installing new wear strips.

1. Starting from the back, start the wear strip onto the rail; then using a block of wood and a hammer, drive the wear strip forward into position.

Fig. 9-384



AG070

2. Secure with a machine screw (coated with red Loctite #271) and lock nut. Tighten to 1.1 kg-m (8 ft-lb).

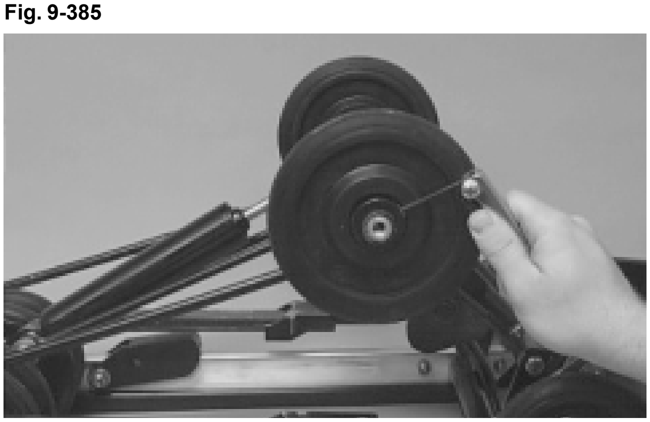
Rear Spring

■ **NOTE: The skid frame must be removed for this procedure.**

DISASSEMBLING

1. Remove the set screw from the lock collar securing the upper idler wheel to the rear arm; then remove the lock collar and idler wheel.

Fig. 9-385



AG307D

■ **NOTE: It may be necessary to use the Idler Wheel Puller Kit (p/n 0644-122).**

2. Slide the spring and the plastic sleeve off the rear arm.

Fig. 9-386



AG308D

3. Repeat steps 1 - 2 for the other rear spring.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the spring slide, washers, and shaft area for wear.

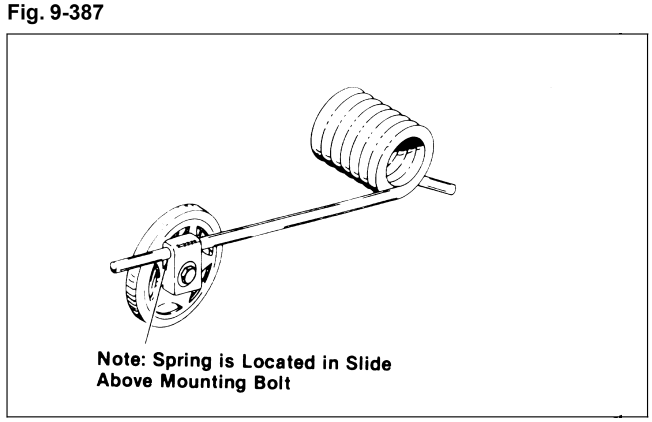
2. Inspect the spring adjusting cams (spring adjuster blocks) for cracks.

ASSEMBLING

1. Slide the spring and plastic sleeve onto the rear arm.

2. Position the long spring leg into the spring slide. Make sure the spring is located above the spring slide mounting bolt.

Fig. 9-387



0727-896

3. Install the idler wheel with the snap ring facing inward on the rear arm and secure with a lock collar and set screw.

4. Repeat steps 1-3 for the other rear spring.

■ **NOTE: When installing the opposite side spring, make sure the adjusting cam (spring adjuster block) is set in the same position.**

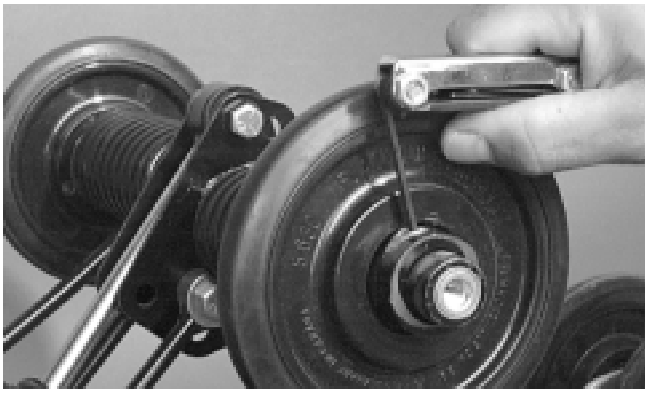
Rear Arm

■ **NOTE: The skid frame must be removed for this procedure.**

DISASSEMBLING

1. Remove the set screw from the lock collar securing the upper idler wheel to the rear arm; then remove lock collar and idler wheel.

Fig. 9-388

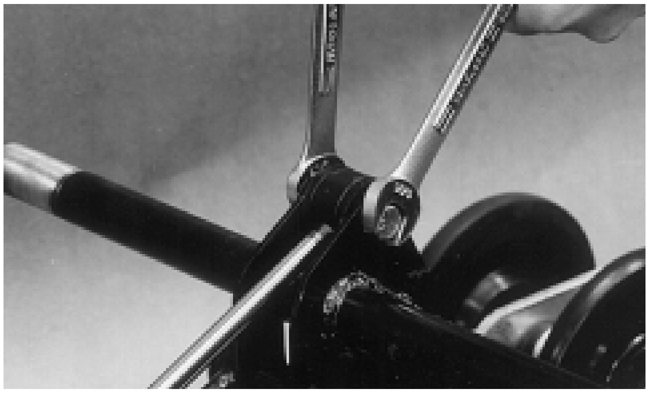


AG625D

■ **NOTE: If an idler wheel is tight on the rear arm, use the Idler Wheel Puller Kit (p/n 0644-122) to remove the idler wheel.**

2. Remove the cap screw and lock nut securing the upper shock eyelet to the rear arm.

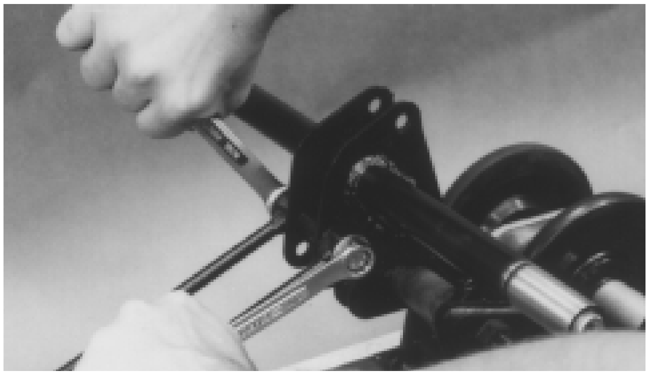
Fig. 9-389



AG309

3. Remove the cap screw and lock nut securing the upper shock link to the rear arm.

Fig. 9-390



AG310

4. Remove the cap screw and large flat washer securing the center pivot idler wheels; then remove the wheels.

Fig. 9-391



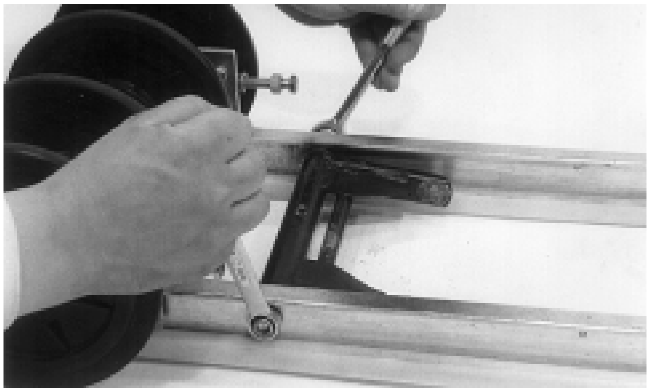
AG600

5. Remove the lock nut and cap screw securing the rear arm at its center pivot point. Account for two axles and a center tube.

6. Remove the lock nut, washer, and cap screw securing the limiter strap to the rear arm. Remove the limiter strap.

7. Remove the lock nut and cap screw securing the lower arm to the slide rails. Twist the arm forward and from between the slide rails.

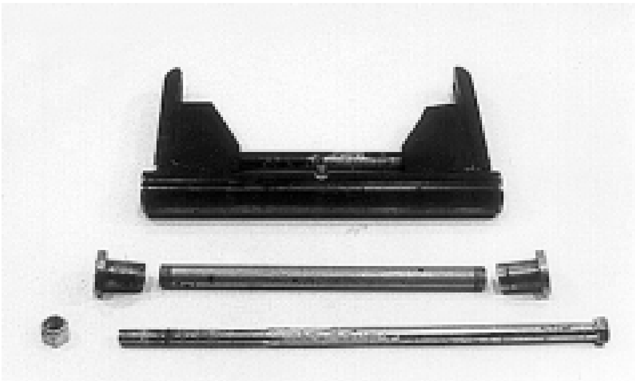
Fig. 9-392



AG083

9

Fig. 9-393



AG084

CLEANING AND INSPECTING

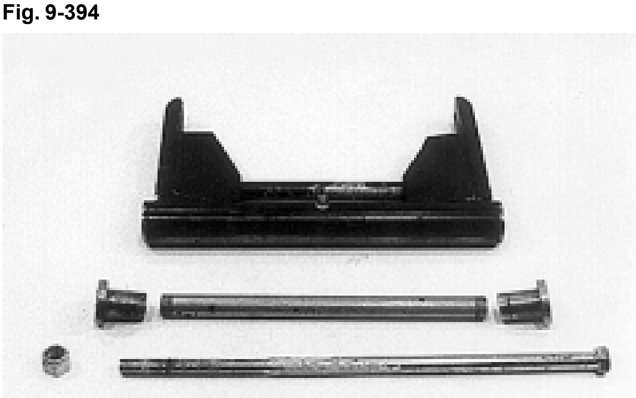
■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean the bearings with a clean cloth.
2. Inspect each idler wheel and plastic hub for cracks or damage.
3. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.
4. Inspect the bushings (located in the arm pivot area) for wear or damage.
5. Inspect all welds and the tubing of the upper arm for cracks or unusual bends.
6. Inspect the two adjusting cams (spring adjuster blocks) for damage.

ASSEMBLING

1. Apply grease to the bushings and axles; then place the axle tube and the two axles into position in the lower arm.

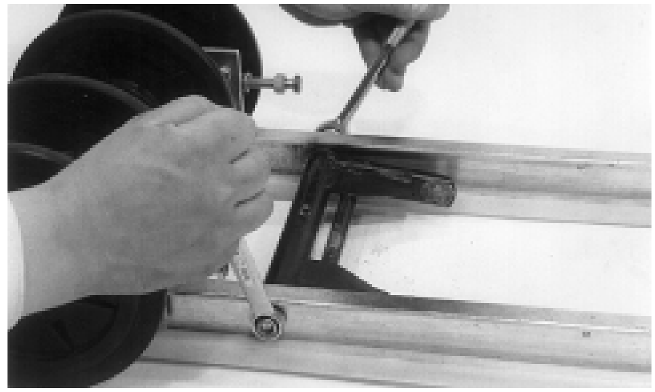
Fig. 9-394



AG084

2. Place the lower rear arm into position between the slide rails; then secure with a cap screw (coated with red Loctite #271) and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-395



AG083

3. Place the center pivot idler wheels into position and secure each with a large flat washer and cap screw. Tighten to 3.2 kg-m (23 ft-lb).

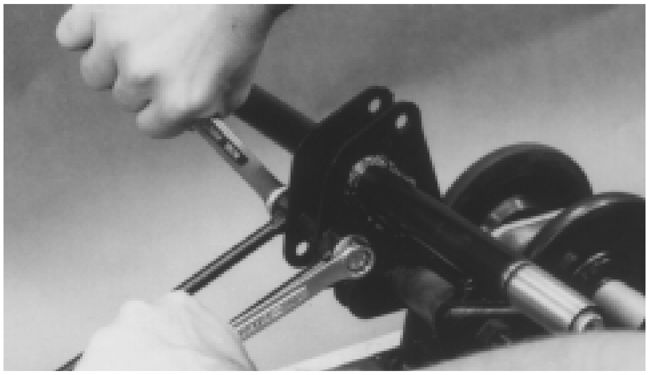
Fig. 9-396



AG600

4. Position the upper arm with axles into the lower arm; then secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).
5. Place the limiter strap into position around the upper and lower arm tubes and secure with cap screw, washers, and lock nut. Tighten to 1.1 kg-m (8 ft-lb).
6. Position the shock links into the upper hole of the rear arm bracket. Place a spacer between the center of the brackets and push the cap screw through the shock link, spacer, bracket, and remaining shock link. Secure with a washer and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-397



AG310

7. Place the shock eyelet between the upper idler arm brackets and secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

■ **NOTE: Do not over-tighten the shock cap screws as the shock eyelets must be free to pivot.**

8. Grease the pivot tubes of the upper and lower arms.

Front Arm

■ **NOTE: The skid frame must be removed for this procedure.**

DISASSEMBLING

1. Remove the cap screw securing the upper shock absorber eyelet to the front arm. Pull the shock eyelet free of the bracket.

Fig. 9-398



AG303

2. Remove the upper cap screw, washer, and lock nut securing each limiter strap to the front arm.

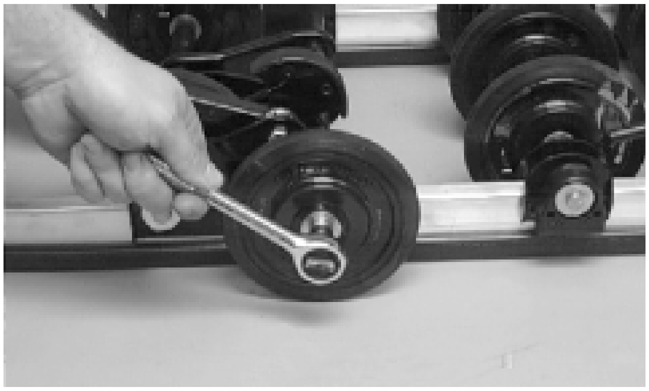
Fig. 9-399



AG300

3. Remove the cap screws and washers securing the outer idler wheels; then slide the idler wheels from the shaft.

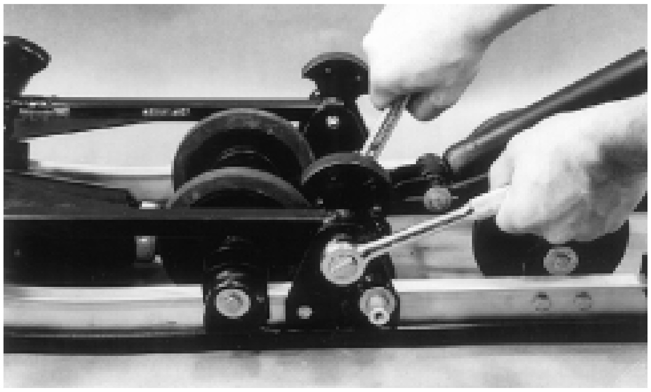
Fig. 9-400



AG322D

4. Remove the two cap screws and lock nuts securing the front arm to the slide rail brackets.

Fig. 9-401



AG304

5. Remove the front arm and account for the axles.

9

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect all front arm weldments for cracks or unusual bends.
2. Inspect all tubing (square and round) for cracks or unusual bends.
3. Inspect the bushings and axles for wear or damage.
4. Inspect the track bumpers (upper and lower). If worn, drill out the rivets securing the bumpers to the arm and replace with new bumpers.

ASSEMBLING

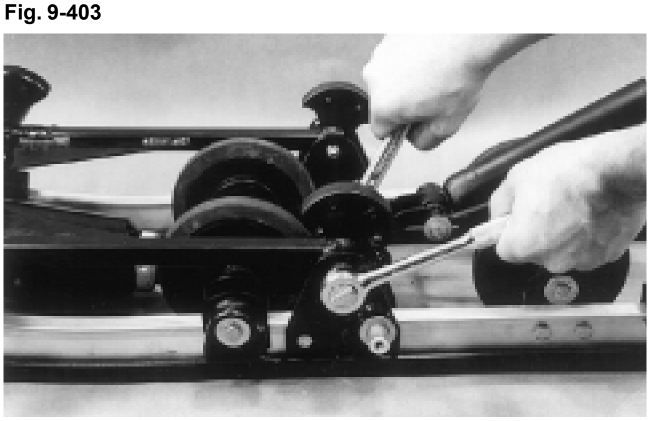
1. Apply a light coat of grease to the axles and bushing areas. Position the front arm into the mounting brackets (upper holes) and secure with two cap screws and lock nuts. Position the lock nuts to the inside of the brackets. Tighten to 4.2 kg-m (30 ft-lb).

Fig. 9-402



AG305

Fig. 9-403



AG304

2. Wrap the limiter straps around the front arm and align the holes. Secure each strap with a cap screw, washers (one on each side of the strap), and lock nut. Tighten to 1.1 kg-m (8 ft-lb).

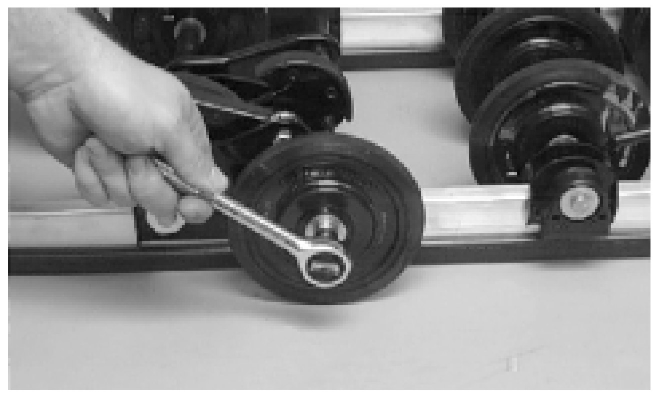
Fig. 9-404



AG300

3. Install the outer idler wheels on the idler wheel shaft and secure with flat washers and cap screws (coated with red Loctite #271). Tighten to 2.4 kg-m (17 ft-lb).

Fig. 9-405



AG322D

4. Position the shock eyelet with bushing into the bracket and secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-406



AG303

■ NOTE: Do not over-tighten the shock cap screws as the shock eyelets must be free to pivot.

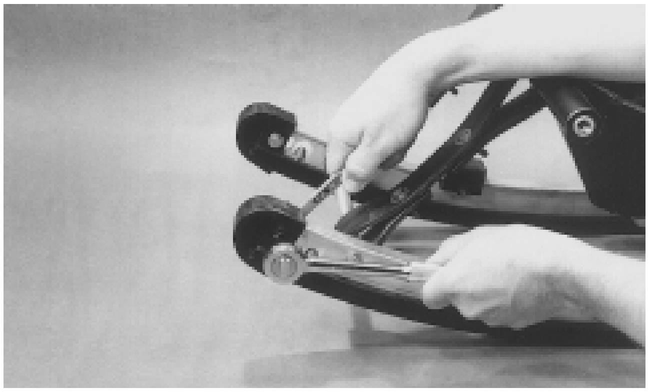
Front Idler Wheels and Bracket, Front Shock Bracket, and Front Arm Bracket

■ **NOTE: The skid frame must be removed for this procedure.**

DISASSEMBLING

1. Remove the lock nut, washer, and cap screw securing the end cap; then remove the end cap.

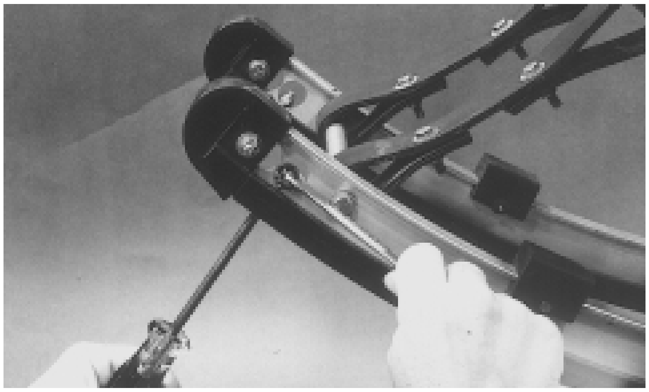
Fig. 9-407



AG297

2. Remove the lock nut securing the wear strip to the slide rail.

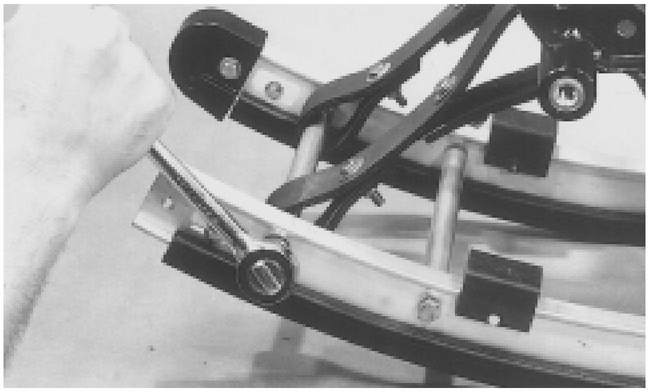
Fig. 9-408



AG298

3. Remove the four cap screws securing both front crossbraces; then remove the crossbraces.

Fig. 9-409



AG301

4. Remove the push nut and pin securing the rubber shock pad and remove the pad.

5. Remove the cap screws and flat washers securing the front idler wheels to the front arm bracket.

6. Remove the cap screw and lock nut securing the lower shock eyelet to the front shock bracket. Swing the shock forward and out of the bracket. Account for a bushing.

Fig. 9-410



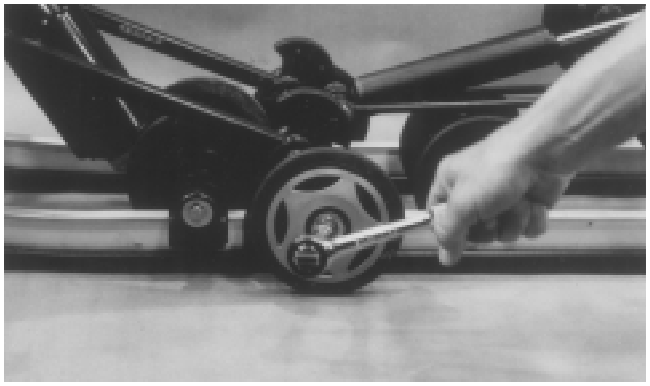
AG317

7. Slide the idler wheel axle out of the front arm brackets and idler wheels; then remove the idler wheels. Account for spacers.

8. Remove the cap screw and flat washer securing the outer idler wheel. Remove the outer idler wheel and account for two spacer washers.

9

Fig. 9-411

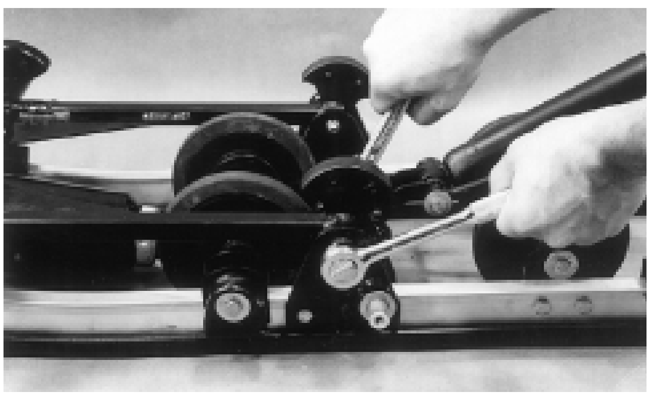


AG321

9. Slide the inner axles out of the front arm brackets; then remove the front shock bracket.

10. Remove the cap screw and lock nut securing the front arm to the front arm bracket.

Fig. 9-412



AG304

11. Remove the cap screws and lock nuts securing the front arm bracket to the slide rail; then slide the front arm bracket forward off the slide rail.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect all weldments for cracks or unusual bends.

2. Inspect all tubing (square and round) for cracks or unusual bends.

3. Inspect the bushings and axles for wear or damage.

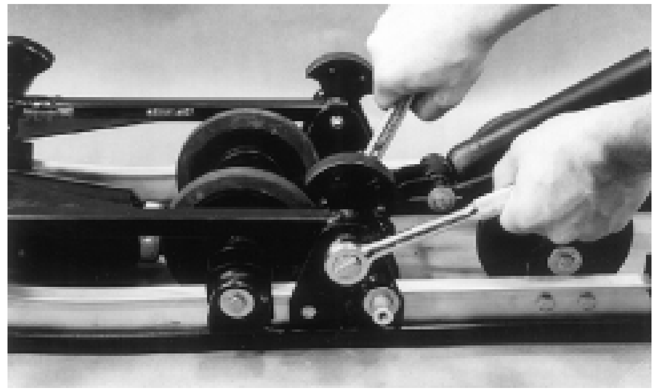
4. Inspect the track bumpers (upper and lower). If worn, remove the rivets securing the bumpers to the arm and replace with new bumpers.

ASSEMBLING

1. Slide the front arm bracket on the slide rail. Install the cap screws (coated with red Loctite #271) and lock nuts. Tighten to 2.4 kg-m (17 ft-lb).

2. Position the front arm into the front arm bracket. Install the cap screw and lock nut. Tighten to 4.2 kg-m (30 ft-lb).

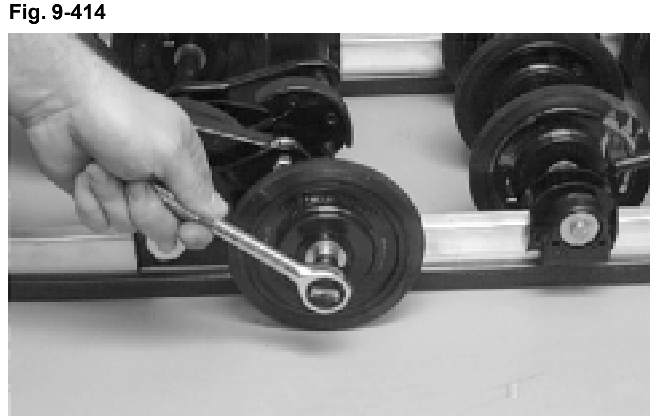
Fig. 9-413



AG304

3. Align the front shock bracket between the front arm brackets; then slide the inner axle through the brackets. Install the spacers and outer idler wheels on the inner axle and secure with flat washer and cap screw (coated with red Loctite #271). Tighten to 2.4 kg-m (17 ft-lb).

Fig. 9-414



AG322D

4. Place the front idler wheels and spacers into position and slide the idler wheel axle through the idler wheels and front shock bracket.

5. Secure the front idler wheels to the front arm bracket with flat washers and cap screws. Tighten to 3.2 kg-m (23 ft-lb).

6. Install the bushing into the lower shock eyelet and place the lower shock eyelet into the front shock bracket. Install the cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-415

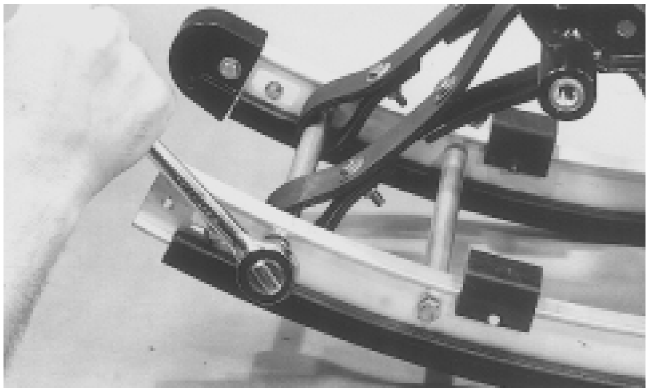


AG317

7. Install the rubber shock pad on the slide rail and secure with push pin and a new push nut.

8. Place both front crossbraces between the slide rails and secure with four cap screws (coated with red Loctite #271). Tighten to 2.4 kg-m (17 ft-lb).

Fig. 9-416

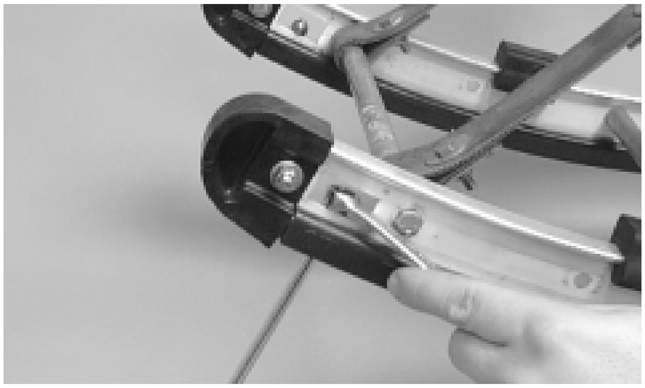


AG301

■ **NOTE: Be sure to place the forward crossbrace through the limiter straps.**

9. Install the lock nut (threads coated with red Loctite #271) securing the wear strip to the slide rail. Tighten to 1.1 kg-m (8 ft-lb).

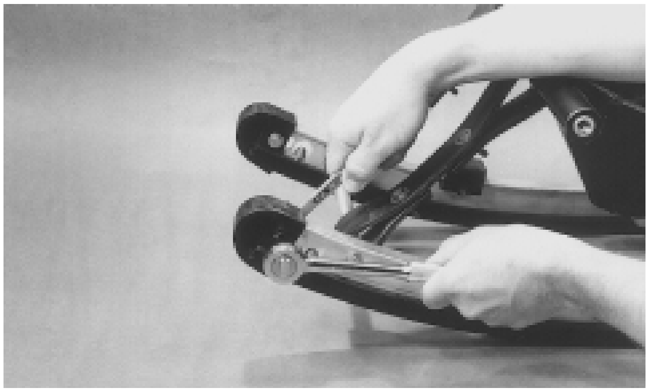
Fig. 9-417



AG298D

10. Place the end cap onto the rail and secure with cap screw, washers, and lock nut. Tighten to 1.1 kg-m (8 ft-lb).

Fig. 9-418



AG297

Front Arm Shock Absorber

■ **NOTE: The skid frame must be removed for this procedure.**

DISASSEMBLING

1. Remove the cap screw and lock nut securing the upper shock absorber eyelet to the front arm. Account for a bushing.

Fig. 9-419



AG306

2. Remove the cap screw and lock nut securing the lower shock eyelet to the front shock bracket. Remove the shock absorber and account for a bushing.

9

Fig. 9-420



AG317

3. Slide the rubber shock boot off the shock absorber.

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enters the shock body.

2. Inspect the shock absorber eyelet welds (at each end) for any cracks or signs of separation.

ASSEMBLING

1. Apply a light coat of grease to both bushings and install the bushings into the shock absorber eyelets.

Fig. 9-421



AG318

2. Position the lower shock absorber eyelet into the crossbrace bracket and secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

3. Position the upper shock absorber eyelet into the front arm bracket and secure with a cap screw (coated with red Loctite #271) and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

■ NOTE: Do not over-tighten the shock cap screws as the shock eyelets must be free to pivot.

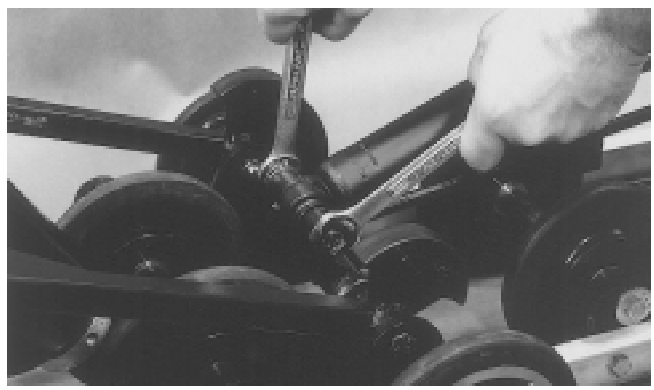
Rear Arm Shock Absorber And Shock Links

■ NOTE: The skid frame must be removed for this procedure.

DISASSEMBLING

1. Remove the cap screw and lock nut securing the lower shock absorber eyelet and shock links to the pivot tube bracket. Account for the two shock link axles.

Fig. 9-422



AG314

2. Remove the cap screw and lock nut securing the upper shock absorber eyelet to the rear arm bracket. Remove the shock absorber.

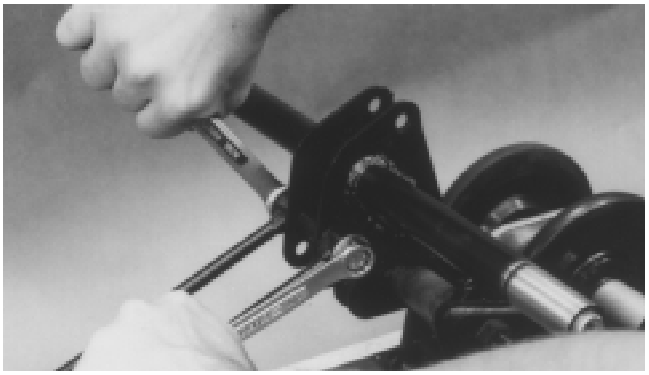
Fig. 9-423



AG309

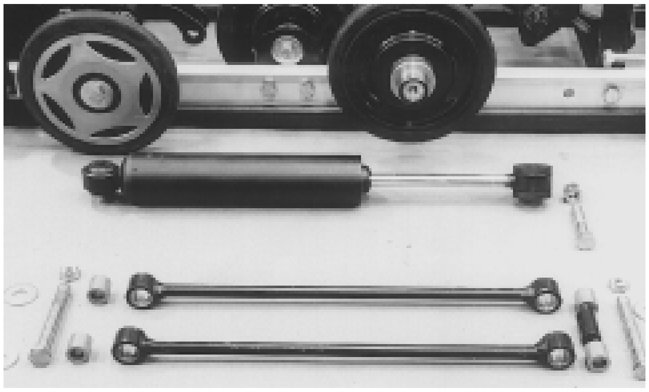
3. Remove the cap screw and lock nut securing the shock links to the upper arm bracket. Account for the spacer, two shock link axles, and washers.

Fig. 9-424



AG310

Fig. 9-425



AG316

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the shock absorber for any signs of oil leakage especially at the point where the shock shaft enter the shock body.

2. Inspect the rubber shock bushings located in the shock absorber eyelets for cracks or deterioration.

3. Inspect the shock absorber eyelet welds (at each end) for any cracks or signs of separation.

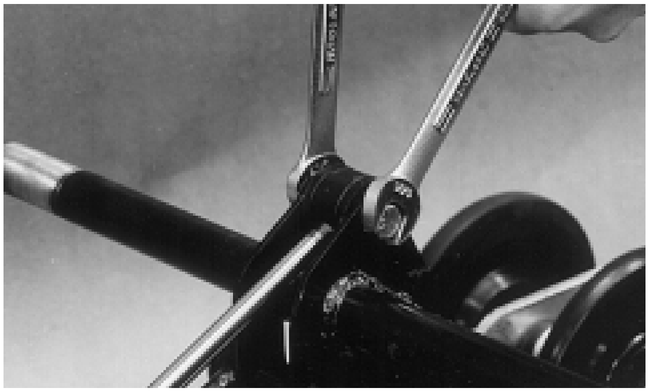
4. Inspect the welds securing the eyelets of the shock links for cracks or signs of separation. Either weld the eyelet or replace the shock link assembly.

5. Inspect the axle surfaces for any signs of corrosion. If corrosion is found, lightly buff the surface of the axle with #400 wet-or-dry sandpaper; then apply a light coat of grease.

ASSEMBLING

1. Apply a thin coat of grease to the upper shock absorber eyelet. Position the eyelet into the upper arm bracket and secure with a cap screw and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

Fig. 9-426



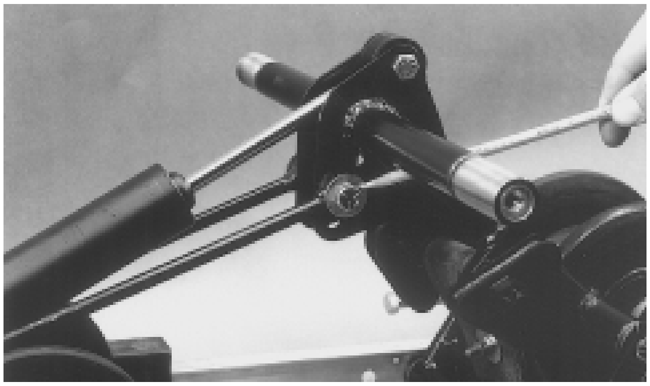
AG309

2. Apply a thin coat of grease to the outer surface of the shock link axles and slide the axles into the shock link eyelets.

3. Place the shock link eyelets on each side of the upper arm bracket and place a spacer into the bracket. Secure the shock links and spacer to the upper arm bracket using a cap screw, washers (on the outside of each eyelet), and lock nut. Tighten lock nut to 3.2 kg-m (23 ft-lb).

■ **NOTE: When installing shock links, the longest side of the shock eyelet must be positioned toward the shock absorber.**

Fig. 9-427

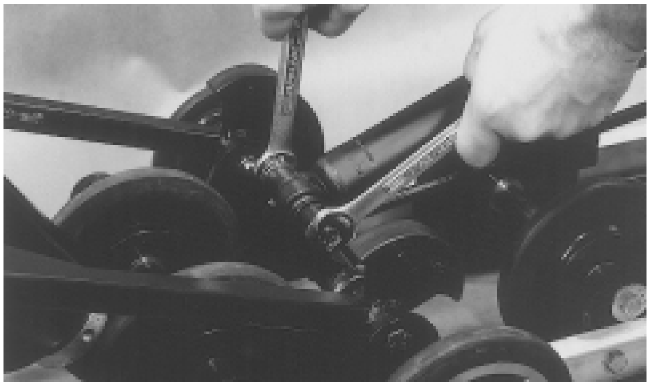


AG313

4. Place the lower shock absorber eyelet into the rear pivot bracket; then place the lower shock link eyelet with bushings into position and secure the lower shock link eyelet and the shock absorber to the rear pivot bracket with a cap screw, two washers, and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

■ **NOTE: Do not over-tighten the shock cap screws as the shock eyelets must be free to pivot.**

Fig. 9-428



AG314

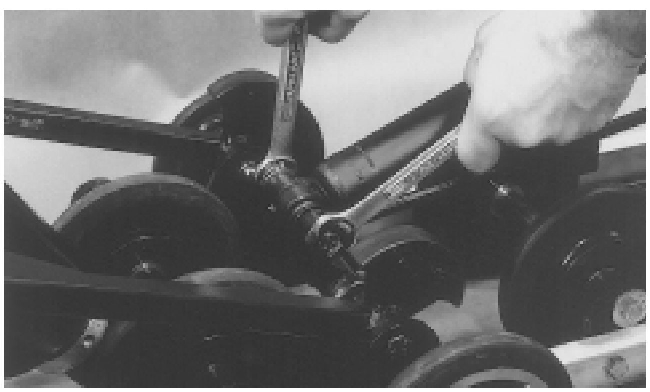
Rear Shock Pivot

■ **NOTE: The skid frame must be removed for this procedure.**

DISASSEMBLING

1. Remove the cap screw and lock nut securing the lower shock absorber eyelet and shock links to the pivot tube bracket. Account for the two shock link axles.

Fig. 9-429



AG314

2. Remove the cap screw and flat washer securing the pivot arm axle to the pivot arm mounting bracket.

3. Slide the inner axle out of the pivot arm bracket far enough to remove the rear shock pivot and account for a spacer axle.

CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all shock pivot components.

2. Inspect all axles for wear or damage.

3. Inspect idler wheel and hub for cracks or damage.

4. Inspect rear pivot for damage.

ASSEMBLING

1. Align the rear shock pivot with the spacers, idler wheels, and washers installed between the pivot arm brackets; then slide the pivot axle through the brackets.

2. Place the lower shock absorber eyelet into the rear pivot bracket; then place the lower shock link eyelets with bushings into position and secure the lower shock link eyelets and the shock absorber to the rear pivot bracket with a cap screw, two washers, and lock nut. Tighten to 3.2 kg-m (23 ft-lb).

■ **NOTE: Do not over-tighten the shock cap screws as the shock eyelets must be free to pivot.**

Center Inner Idler Wheels

■ **NOTE: The skid frame does not have to be removed for this procedure.**

REMOVING

1. Remove the cap screws and flat washers securing the idler wheels and spring slides to the center idler wheel brackets.

Fig. 9-430



AG403

2. Slide the inner axle out of the center idler wheel brackets and remove the idler wheels. Account for two spacer axles and six washers.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect each idler wheel and plastic hub for cracks or damage.

2. Rotate the idler wheel bearings (by hand) and inspect for binding or roughness.

INSTALLING

1. Position the idler wheels with spacers and spacer washers (one on each side of idler wheel) between the center idler wheel brackets.

2. Slide the inner axle through the idler wheel brackets, idler wheels, spacers, and spacer washers.

3. Place the spring slides onto the springs and idler wheel brackets; then secure with two flat washers and cap screws (coated with red Loctite #271). Tighten to 2.4 kg-m (17 ft-lb).

Fig. 9-431



AG403

Slide Rail

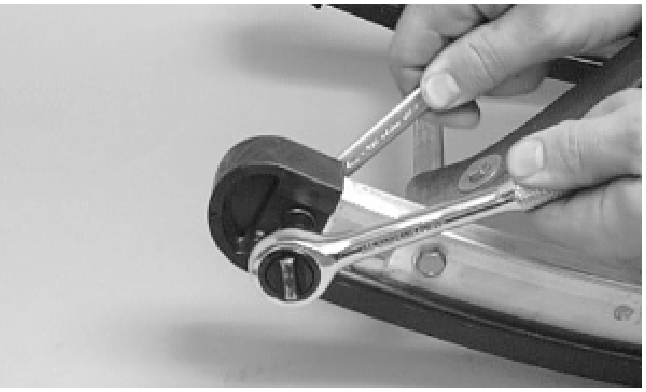
■ **NOTE: The skid frame must be removed for this procedure.**

REMOVING

■ **NOTE: When it is necessary to replace one or both slide rails, it is recommended that one slide rail be removed at a time. The remaining slide rail will then hold the crossbraces and brackets in their correct assembly order. This method is much quicker than to completely disassemble the entire skid frame.**

1. Remove the cap screw, washer, and lock nut securing the end cap to the slide rail. Remove the end cap from the slide rail.

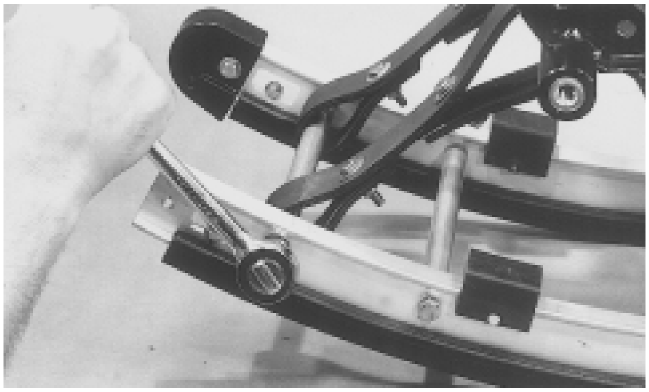
Fig. 9-432



AG297D

2. Remove the four cap screws securing both front crossbraces between the slide rails; then remove the crossbraces.

Fig. 9-433

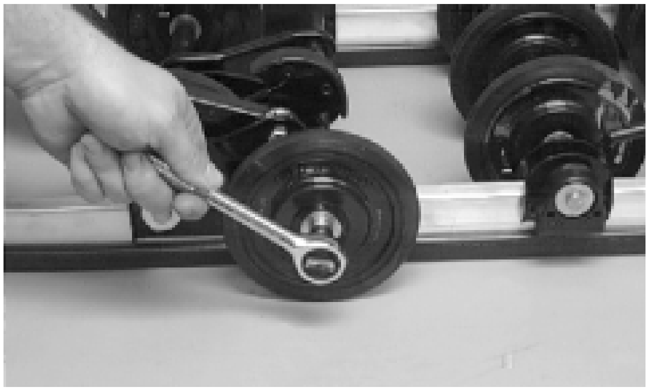


AG301

3. Remove the push nuts and pins securing the rubber shock pads; then remove the shock pads.

4. Remove the cap screw and flat washer securing the outer idler wheel to the front arm bracket.

Fig. 9-434

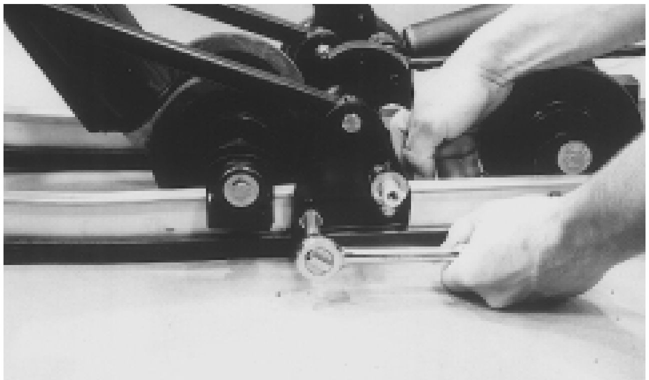


AG322D

5. Remove the three cap screws and lock nuts securing the front arm bracket to the slide rail.

9

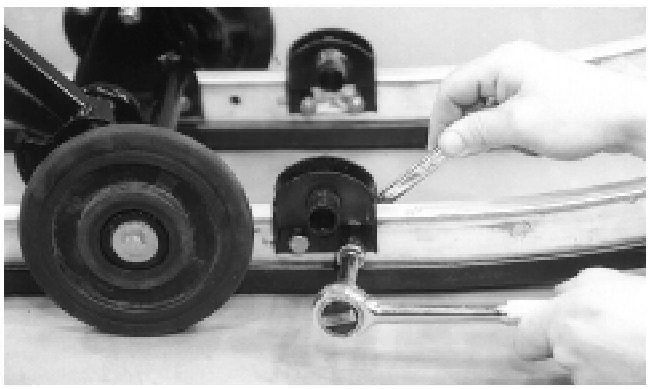
Fig. 9-435



AG323

6. Remove the two cap screws and lock nuts securing the center inner idler wheel bracket to the slide rail.

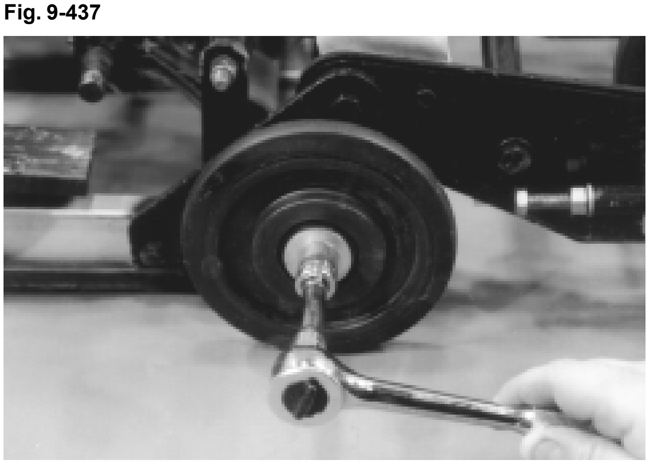
Fig. 9-436



AG390

7. Remove the cap screws and large flat washers securing the center pivot idler wheels; then remove the idler wheels.

Fig. 9-437



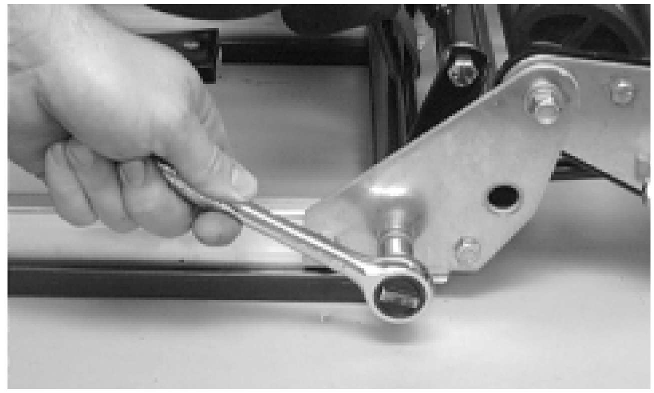
AG600

8. Remove the two cap screws and lock nuts securing the auxiliary wheel bracket.

9. Remove the cap screw, lock nut, and two washers securing the spring block.

10. Remove the long cap screw securing the lower rear arm assembly to the slide rails.

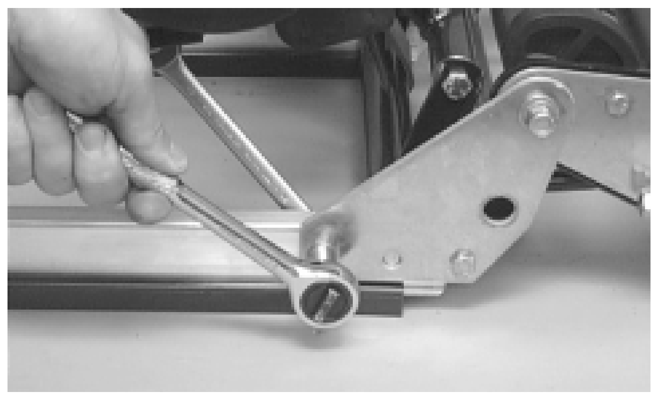
Fig. 9-438



AG332D

11. Remove two cap screws securing each of the articulating frame brackets; then remove the articulating skid frame. Account for spacers.

Fig. 9-439



AG611D

12. Remove the cap screw and nut securing the spring tension block to the slide rail. Account for the washers.

13. With all bracket hardware removed, pull the slide rail slowly forward and out of all brackets.

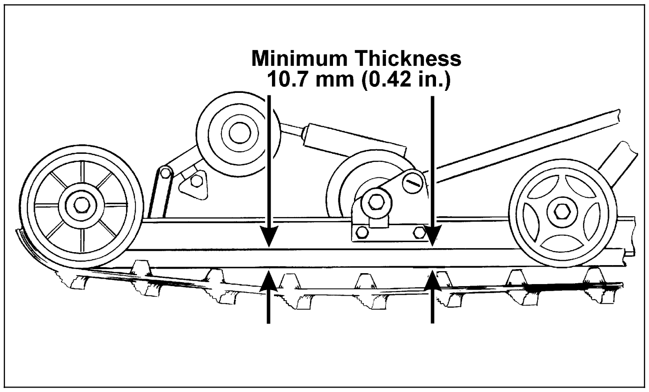
INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the slide rail for cracks or unusual bends.

2. Inspect the wear strip for wear. The wear strip must be 10.7 mm (0.42 in.) thick or thicker. If the wear strip measurement is less than specified, replacement of both wear strips is necessary.

Fig. 9-440

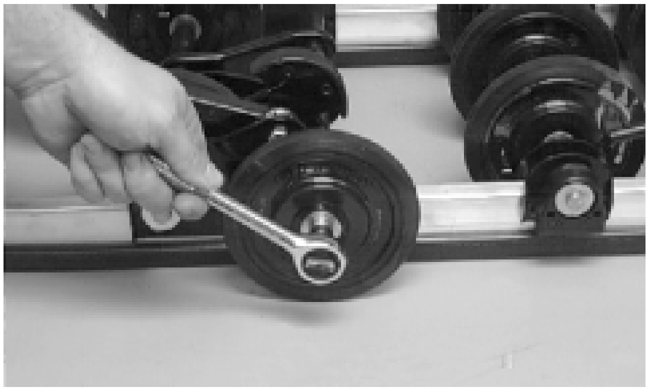


0727-726

INSTALLING

1. Starting in front, place the back end of the slide rail into the first bracket and slowly work it back through all brackets. Install the cap screws and lock nuts securing the slide rail to the brackets. Tighten all slide rail hardware to the recommended torque specifications.
2. Place the spring tension block into position on the slide rail and secure with a cap screw, two washers, and a lock nut. Tighten securely ensuring free movement of the spring tension block.
3. Place the articulating skid frame into position, install spacers, and secure with four cap screws and lock nuts. Tighten to 2.4 kg-m (17 ft-lb).
4. Secure the lower rear arm assembly with the long cap screw, lock nut (threads coated with red Loctite #271), and washers. Tighten to 3.2 kg-m (23 ft-lb).
5. Place the center pivot idler wheels into position and secure each with a large flat washer and cap screw. Tighten to 3.2 kg-m (23 ft-lb).
6. Align the auxiliary wheel bracket, center idler wheel bracket, front arm bracket, and front idler wheel bracket with the appropriate holes in the skid frame. Secure each with cap screws and lock nuts. Tighten to 2.4 kg-m (17 ft-lb).
7. Install the outer idler wheel on the front arm bracket. Secure with a cap screw (coated with red Loctite #271) and lock nut. Tighten to 2.4 kg-m (17 ft-lb).

Fig. 9-441

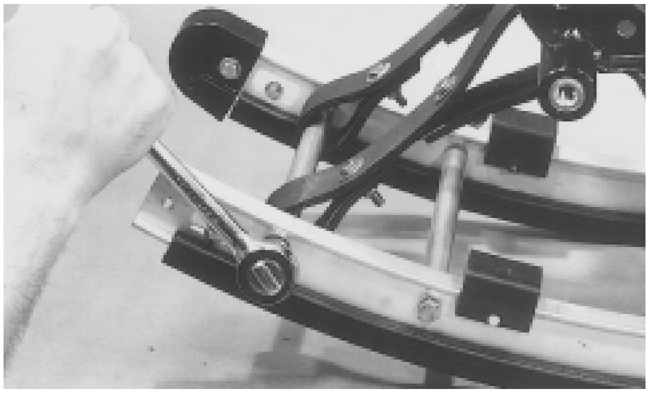


AG322D

8. Place the shock pads into position and secure with pins and push nuts.
9. Install both front crossbraces between the slide rails. Secure with four cap screws (coated with red Loctite #271). Tighten to 2.4 kg-m (17 ft-lb).

■ **NOTE: Be sure to place the forward crossbrace tube through the limiter straps.**

Fig. 9-442



AG301

10. Place the end cap onto the rail and secure with the cap screw, washer, and lock nut. Tighten to 1.1 kg-m (8 ft-lb).

9

Installing Skid Frame

1. Place a piece of cardboard on the floor to protect against scratching and tip the snowmobile onto one side.

2. Pull the track away from the tunnel and spread open; then place the skid frame into the track. Slide the inner axles through the upper and rear arms of the skid frame.

■ **NOTE: The proper front arm tunnel mounting hole to use will depend on which position the front arm brackets are mounted in on the slide rails. If the front arm brackets are positioned in the rear rail mounting holes, use the upper rear mounting holes.**

3. Position the front of the skid frame into the tunnel and align the front arm with the appropriate mounting hole in the tunnel. Slide the lock washer onto the cap screw; then secure the front arm to the tunnel with the cap screw and lock washer. Thread the cap screw in only half way. DO NOT TIGHTEN AT THIS TIME.

■ **NOTE: To aid in centering the front arm with the holes in the tunnel, position the skid frame and track at a 45° angle to the bottom of the tunnel.**

4. Slide the skid frame and track into the tunnel.

5. Tip the snowmobile onto the opposite side and install the remaining front arm cap screw and lock washer. Use the same procedure as step 3.

6. Align the rear arm with the forward mounting hole in the bracket. Secure the rear arm with a cap screw and lock washer. DO NOT TIGHTEN AT THIS TIME.

■ **NOTE: Do not tighten any of the four cap screws until all have been started. To obtain proper alignment of the rear arm, pry the arm in the proper direction until alignment is obtained.**

7. Again tip the snowmobile onto the opposite side and install the remaining rear arm cap screw and lock washer. Follow the same procedure as in step 6.

8. Tighten all four skid frame mounting cap screws to 3.2 kg-m (23 ft-lb).

9. Check track tension; adjust as necessary (see Track Tension in this sub-section).

10. Check track alignment; adjust as necessary (see Track Alignment in this sub-section).

Track Tension

⚠ WARNING

Turn all switches to the OFF position.

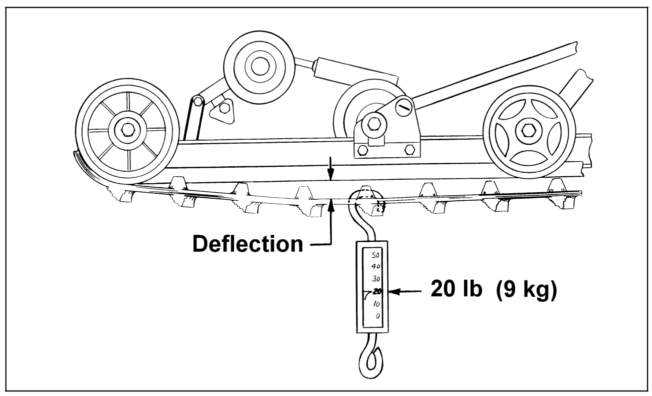
CHECKING DEFLECTION

1. Tip the snowmobile on its side.

2. Hook a spring scale around a track clip at mid-span; then pull the track down with the scale to 9 kg (20 lb) and measure the distance between the bottom of the wear strip and the inside surface of the track clip. Track deflection must be within specifications.

Rear Suspension Style	Setup Tension	After Break-In Tension
FasTrack w/o Torque Sensing Link	19-25 mm (3/4-1 in.)	25-32 mm (1-1 1/4 in.)
FasTrack w/Torque Sensing Link (121 in. Track)	32-38 mm (1 1/4-1 1/2 in.)	38-44 mm (1 1/2-1 3/4 in.)
FasTrack w/Torque Sensing Link (136 in. Track)	38-44 mm (1 1/2-1 3/4 in.)	50.8-57.2 mm (2-2 1/4 in.)

Fig. 9-443



729-429A

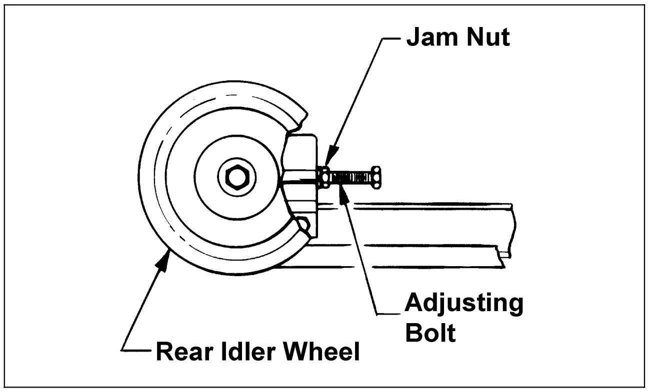
■ **NOTE: If the track is new, it will stretch slightly and take a "set" within the first 300 to 500 miles of operation.**

ADJUSTING DEFLECTION

1. Place the snowmobile on a shielded safety stand. Check to make sure the track is 2 - 3 in. off the floor.

2. If the measurement is not as specified, loosen the jam nuts of the adjusting bolts.

Fig. 9-444



3. If the measurement is more than specified, tighten the adjusting bolts. If the measurement is less than specified, loosen the adjusting bolts. When the measurement is within specification range, lock the adjustment by bottoming the jam nuts against the axle housings.

■ **NOTE: Vigorously push the underside of the track up and down. Track must not hit the top of the tunnel or slap the skid frame.**

4. After correct track tension is obtained, check track alignment (see Track Alignment in this sub-section).

■ **NOTE: Track tension and track alignment are interrelated; always check both even if only one adjustment seems necessary. Always establish correct track tension before checking and/or adjusting alignment.**

Track Alignment

■ **NOTE: Proper track alignment is when the rear idler wheels are equidistant from the inner drive lugs on the inside surface of the track.**

CHECKING

1. Using a shielded safety stand, raise the rear of the snowmobile off the floor making sure the track is free to rotate.

⚠ WARNING

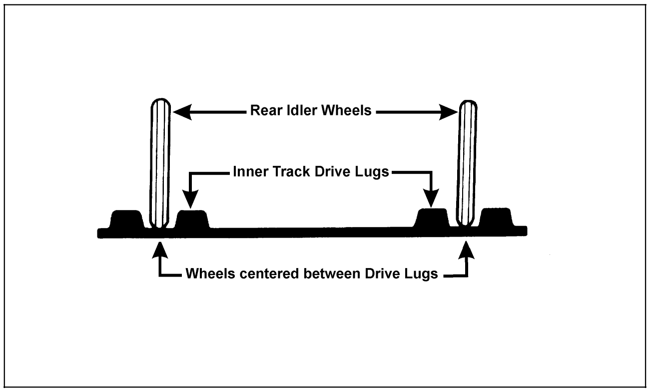
The tips of the skis must be positioned against a wall or similar object for safety. Keep hands, feet, and clothing away from moving components.

2. Start the engine and accelerate slightly. Use only enough throttle to rotate the track several revolutions. SHUT THE ENGINE OFF.

■ **NOTE: Allow the track to coast to a stop. DO NOT apply the brake because it could produce inaccurate alignment conditions.**

3. When the track stops rotating, check the relationship of the rear idler wheels and the inner track drive lugs. If the distance from the idler wheels to the inner track drive lugs is the same on both sides, no adjustment is necessary.

Fig. 9-445



■ **NOTE: If the distance from the idler wheels to the inner track drive lugs is not the same on both sides, an adjustment is necessary.**

ADJUSTING

1. On the side of the track which has the inner drive lugs closer to the rear idler wheel, loosen the adjusting bolt jam nut; then rotate the adjusting bolt clockwise 1-1 1/2 turns.

2. Continue to check the track alignment and make the necessary adjustments until proper alignment is obtained.

3. After proper track alignment is obtained, lock the adjusting bolt jam nut against the axle housing.

■ **NOTE: Make sure correct track tension is maintained after adjusting track alignment.**

■ **NOTE: Field test the track under actual conditions and, after the field test, recheck track alignment and track tension; adjust as necessary.**

Overload Springs

To either engage or disengage the spring tension blocks, use the Spring Block Tool, a spark plug socket, and a screwdriver and rotate the spring block to the desired position. Both spring blocks must be in the same position (either engaged or disengaged).

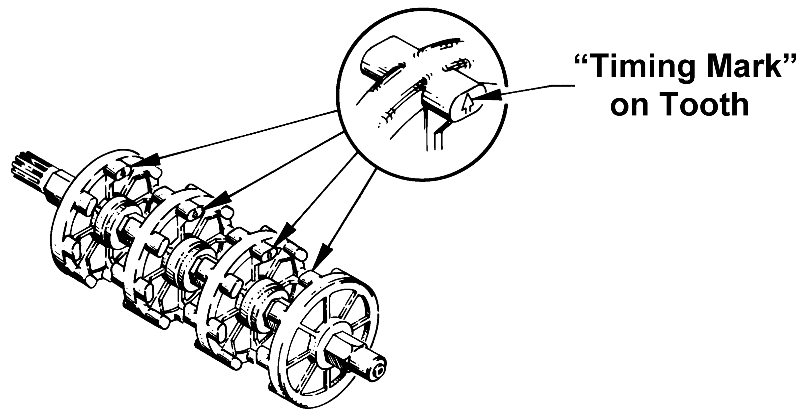
DRIVE SPROCKET LOCATION (1984-2000)

The following drawings will provide all necessary information to relocate sprockets on the driveshaft.

When information is required to assemble the driveshaft, refer to the parts manual for model being worked on; then refer to the following illustrations using the part number listed in the parts manual as a reference.

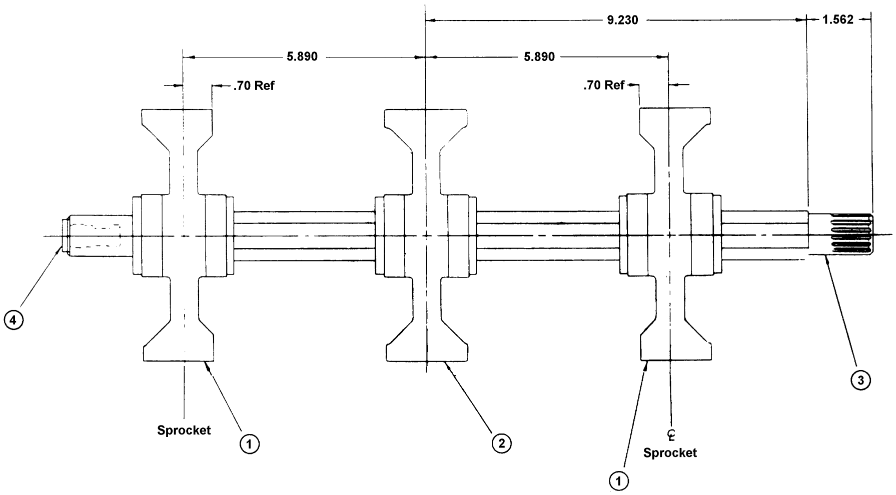
When pressing new sprockets on the driveshaft, remember to align the sprocket alignment marks or the sprockets won't be timed correctly. See illustration below.

Fig. 9-446



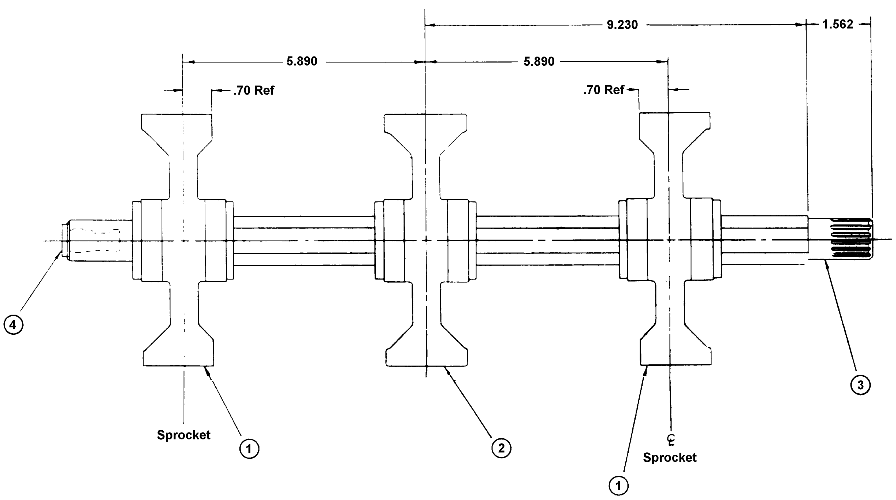
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0728-001



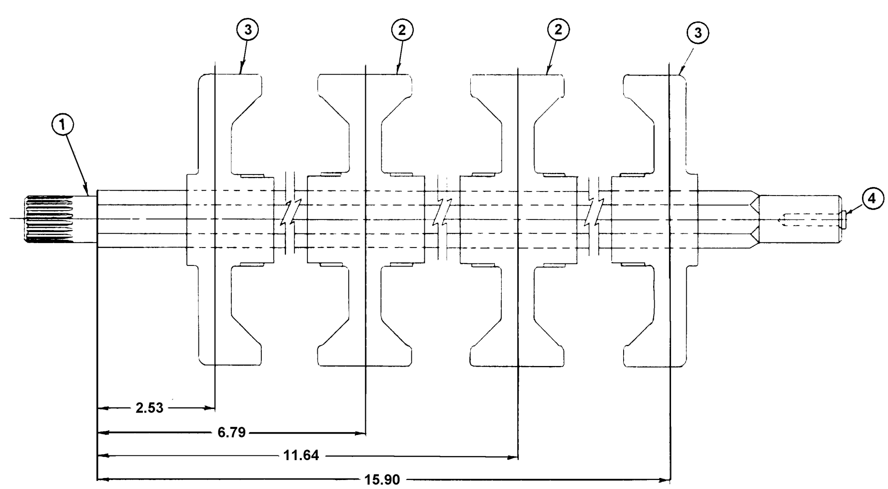
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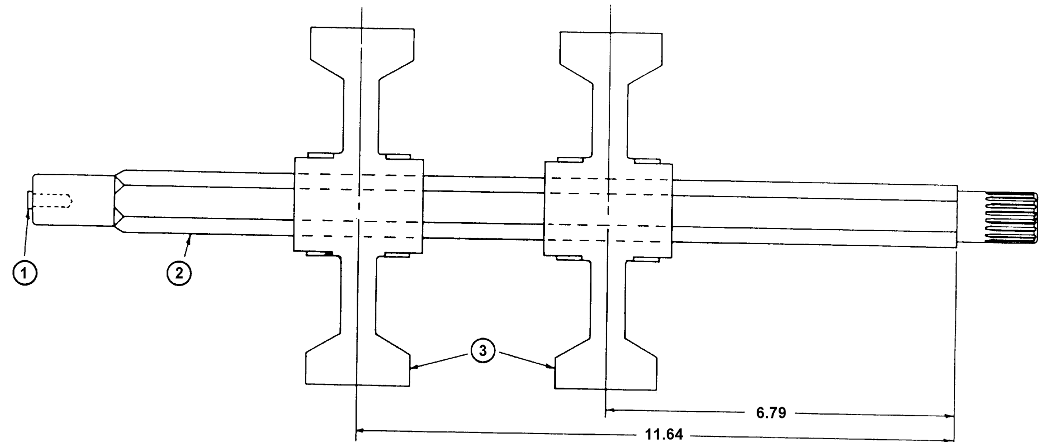
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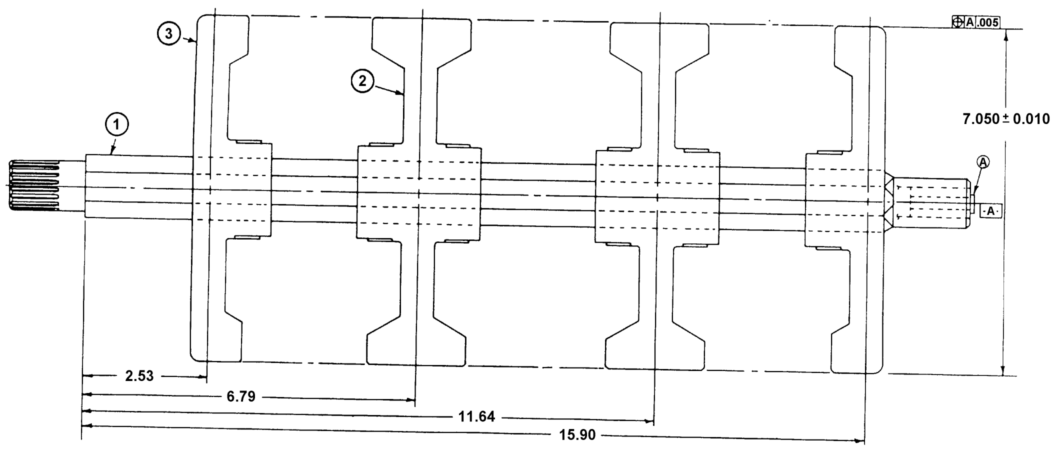
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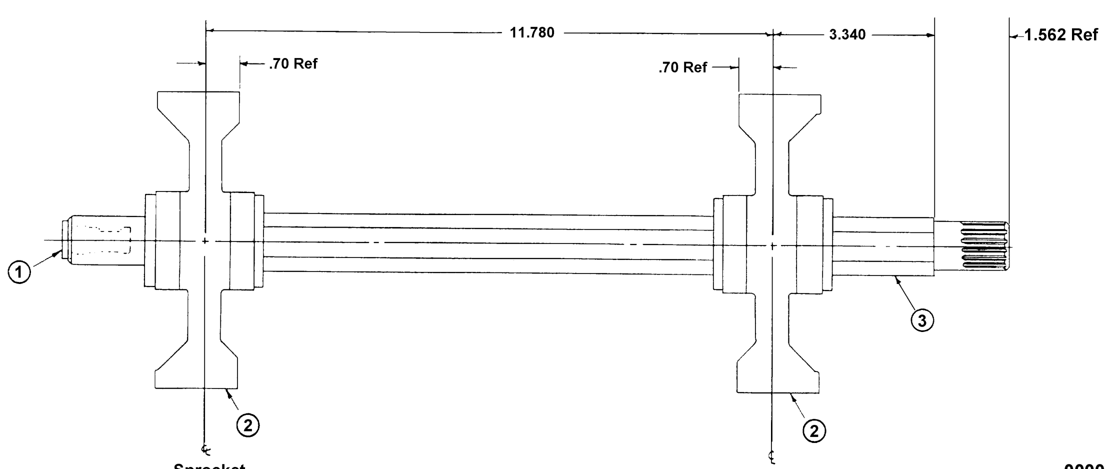
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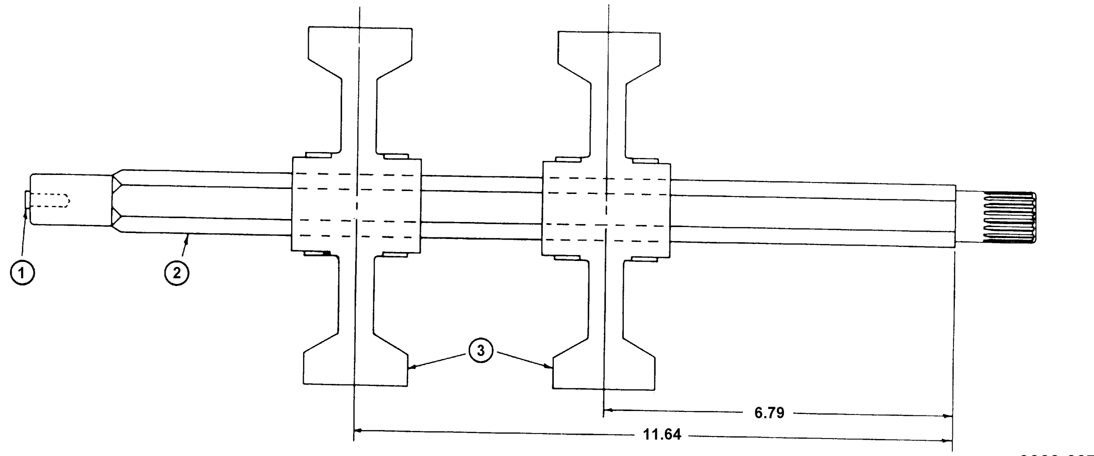
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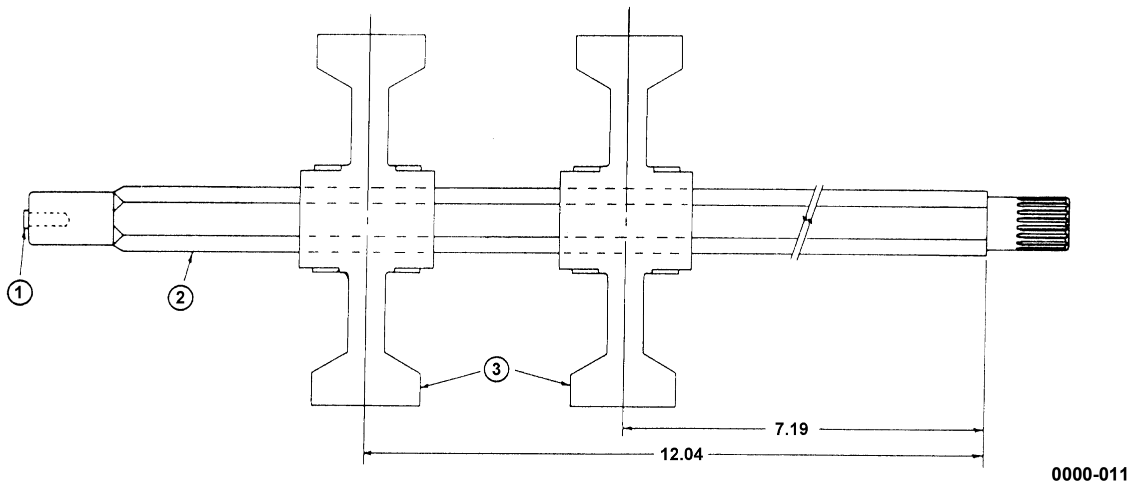
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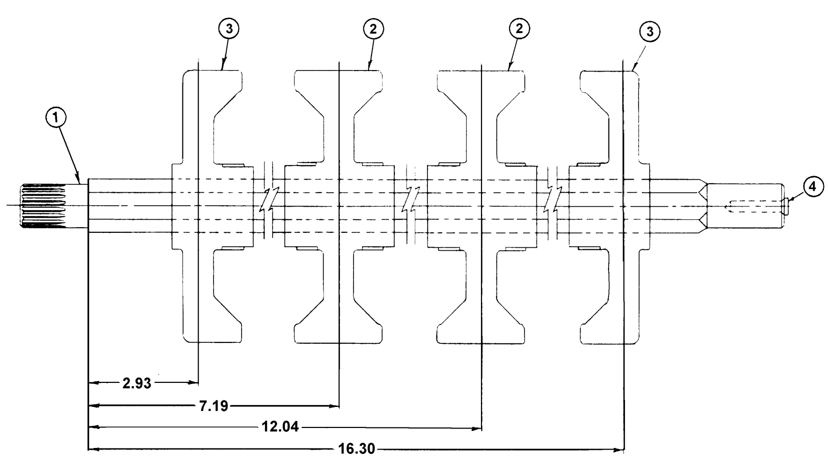
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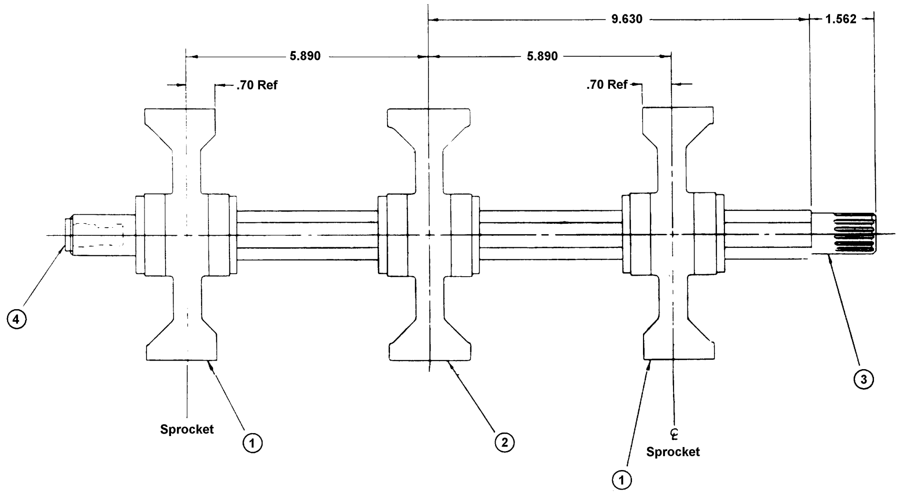
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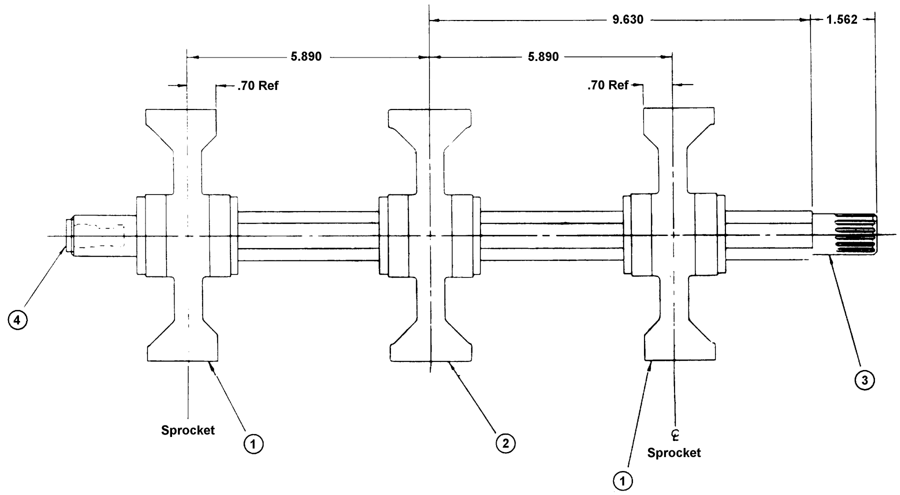
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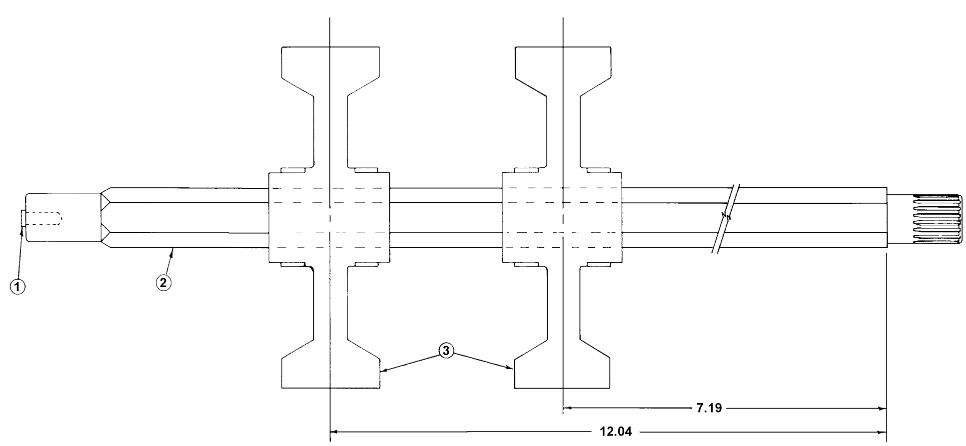
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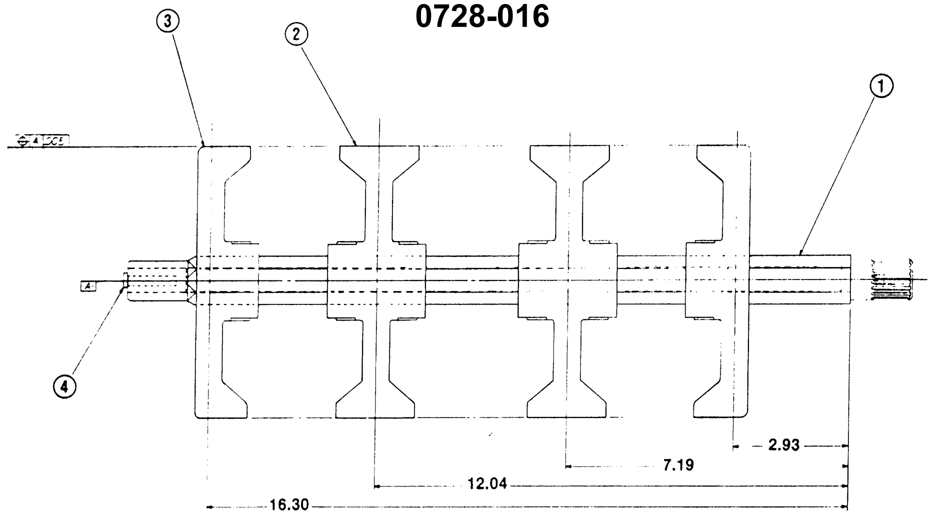
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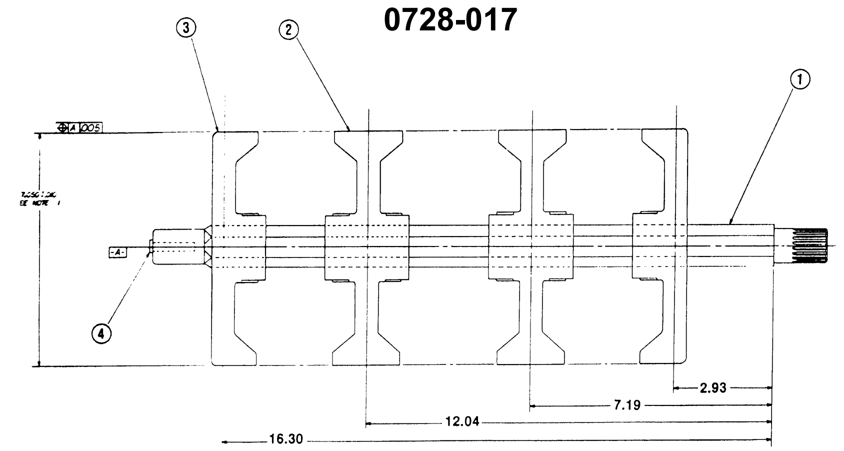
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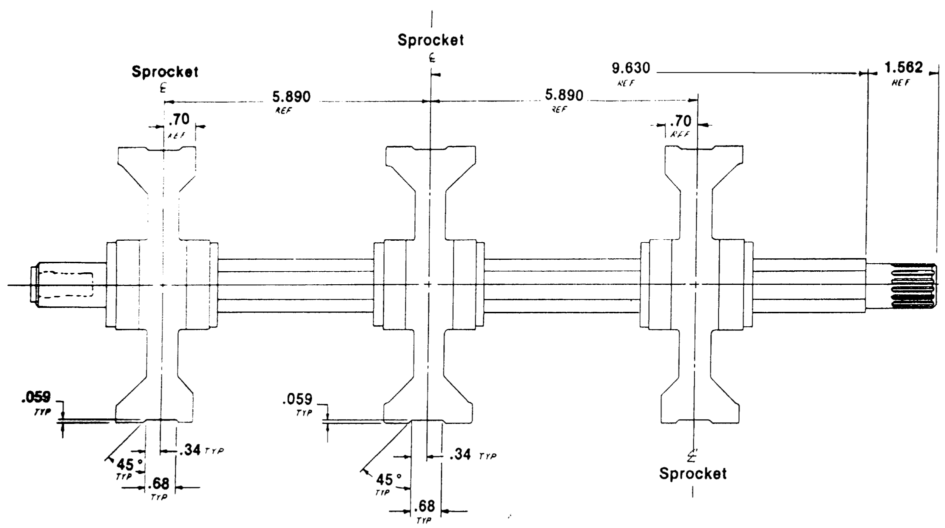
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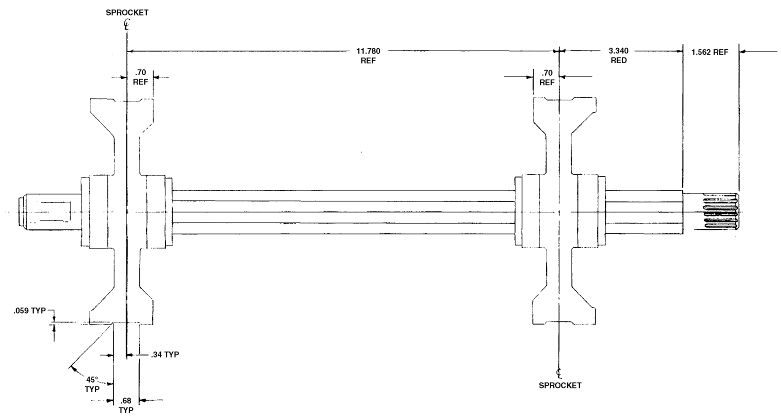
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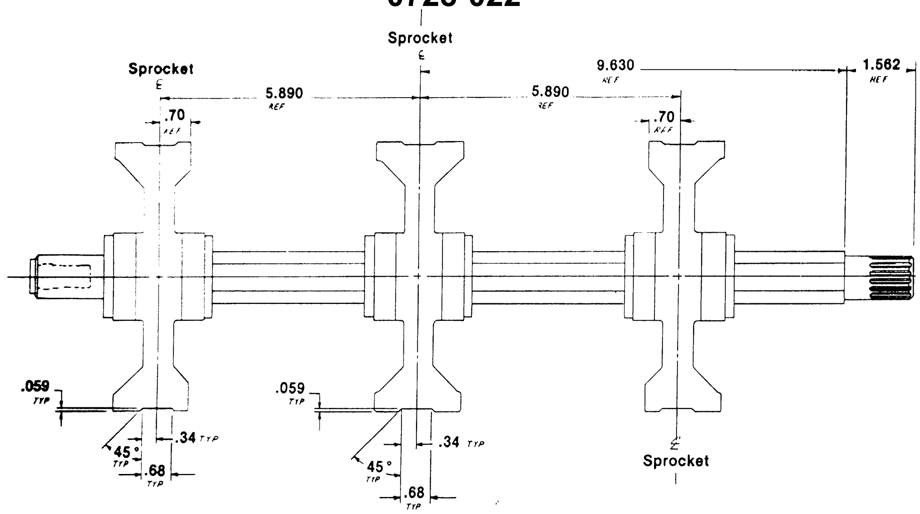
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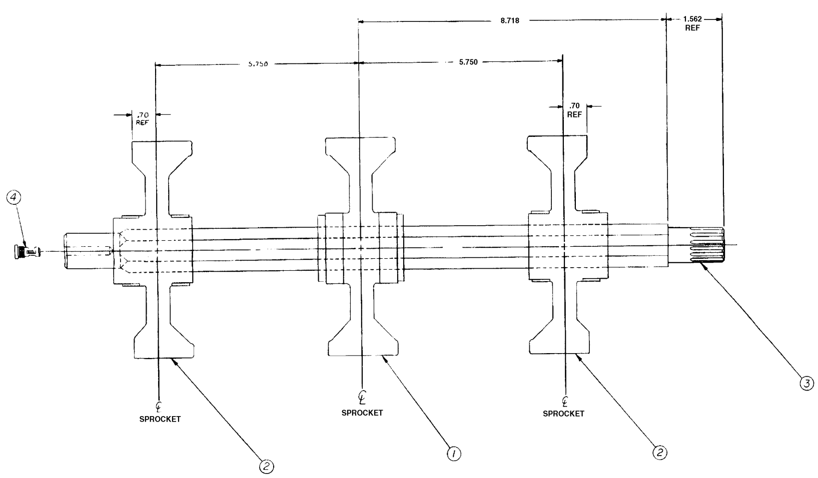
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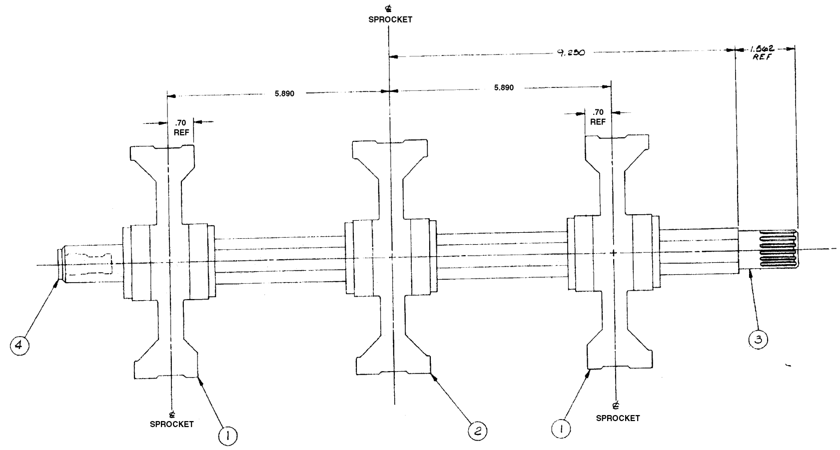
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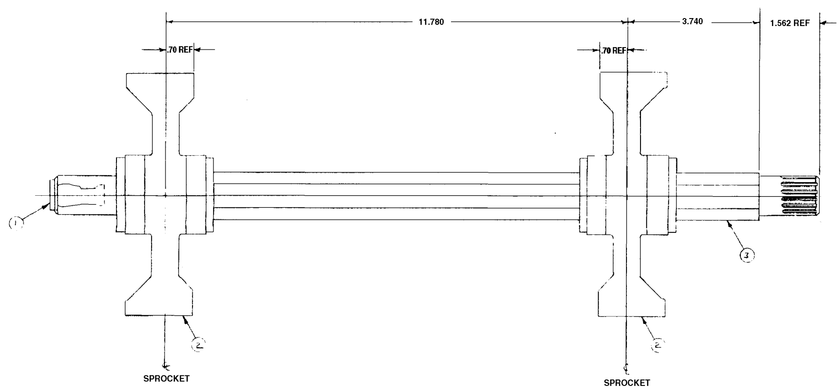
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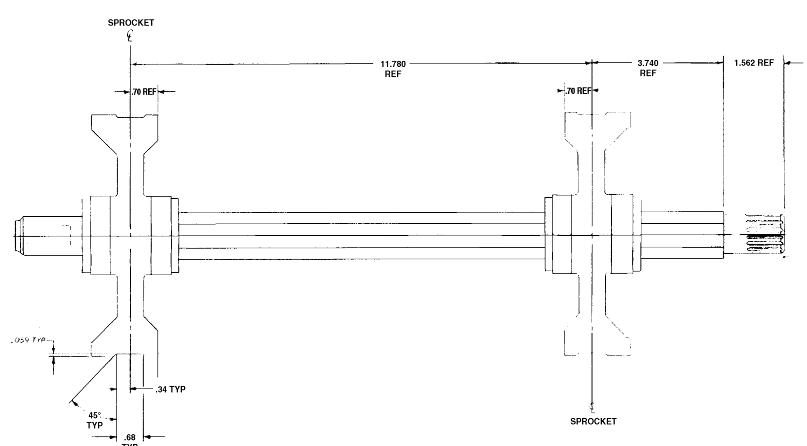
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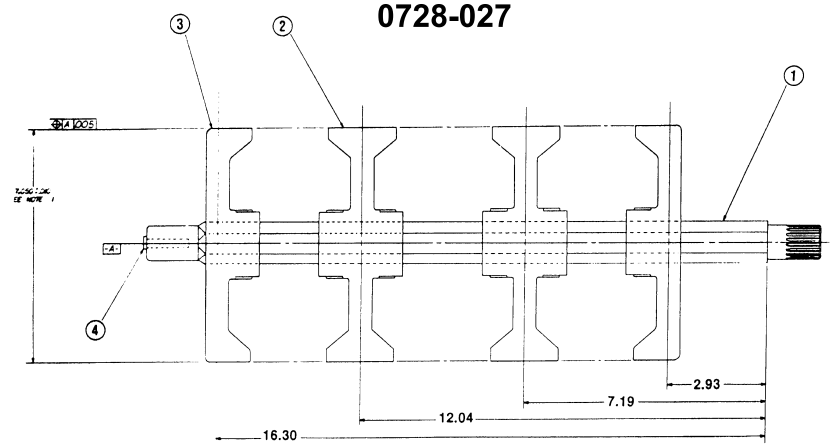
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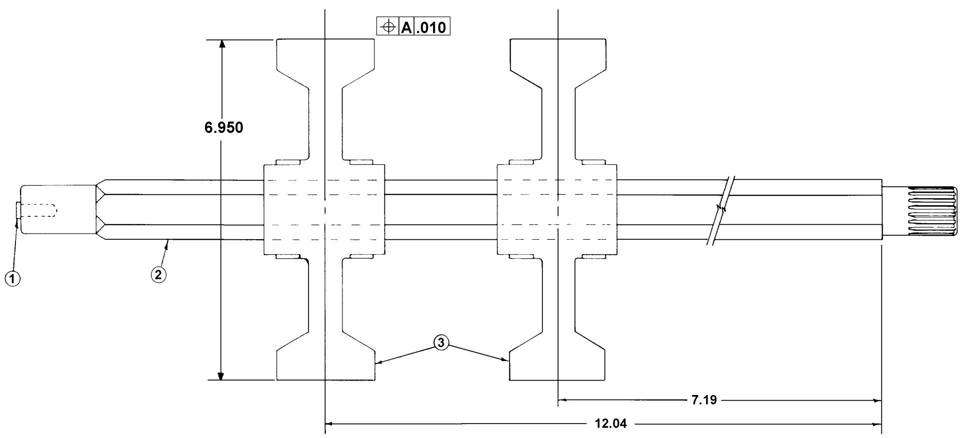
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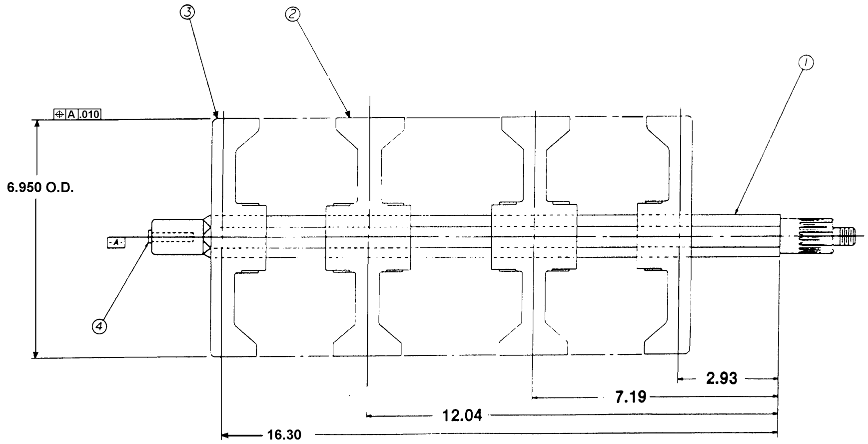
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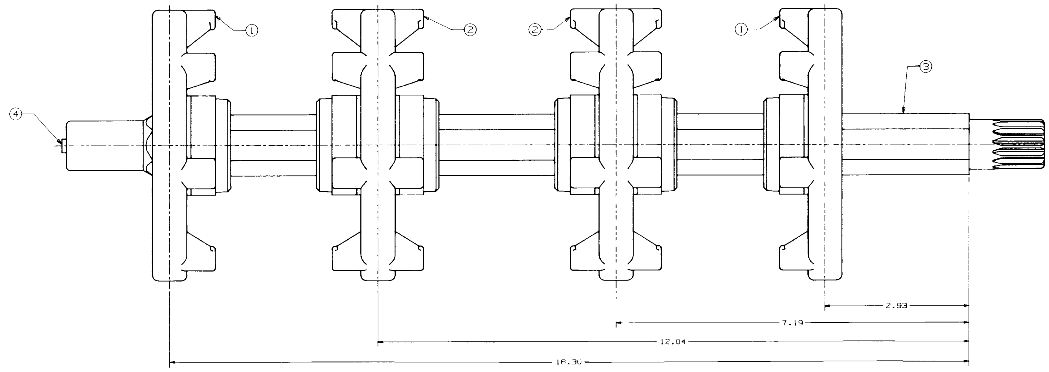
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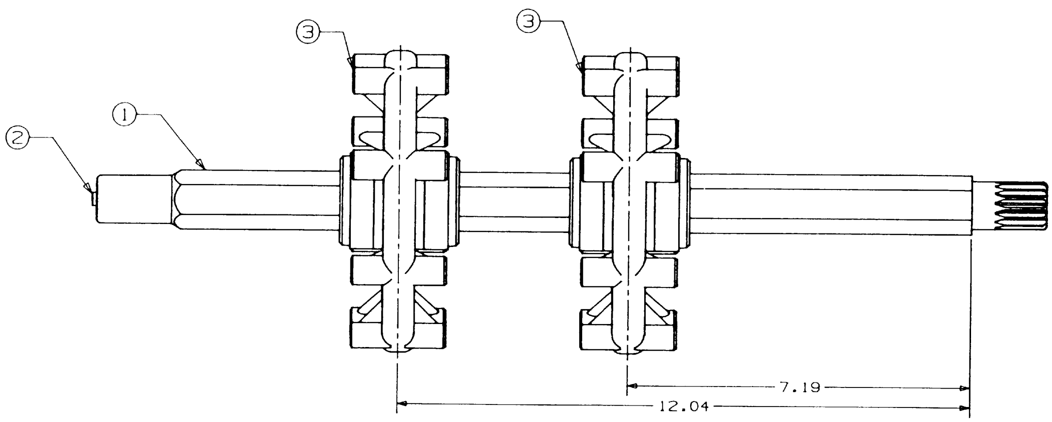
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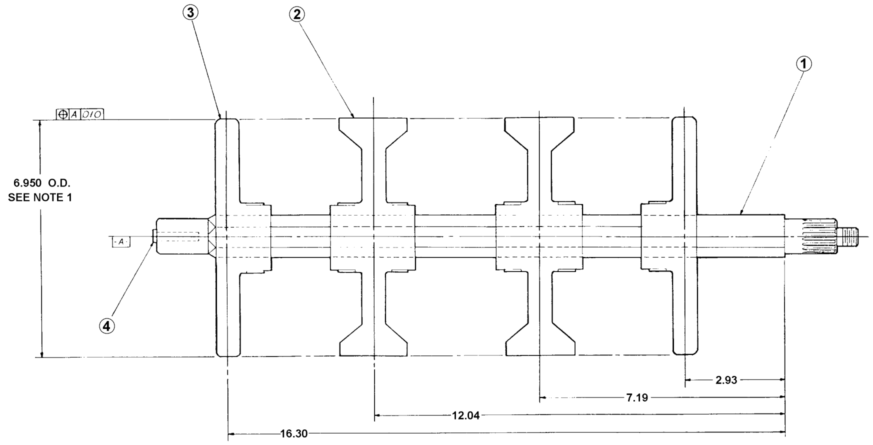
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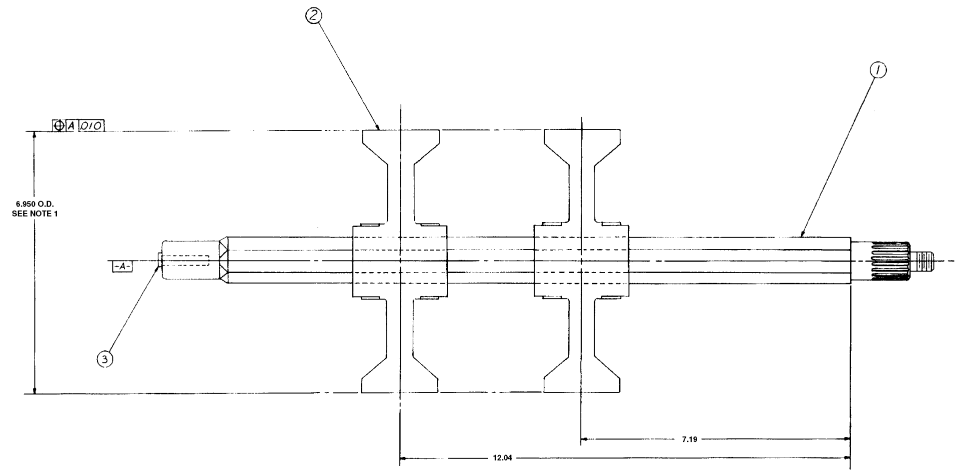
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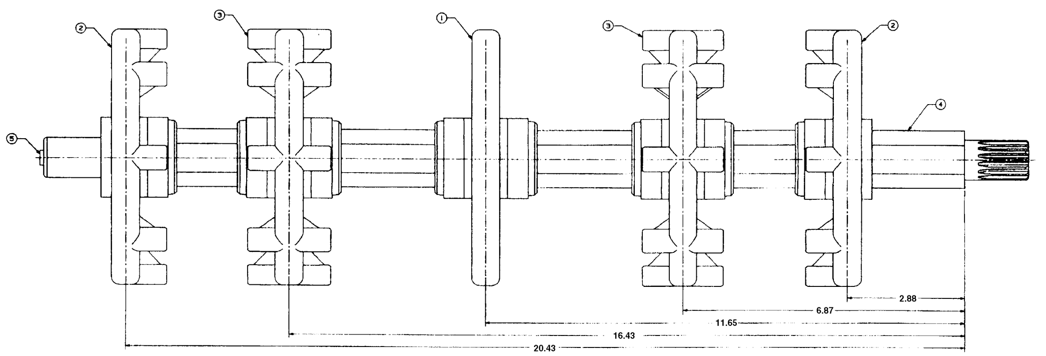
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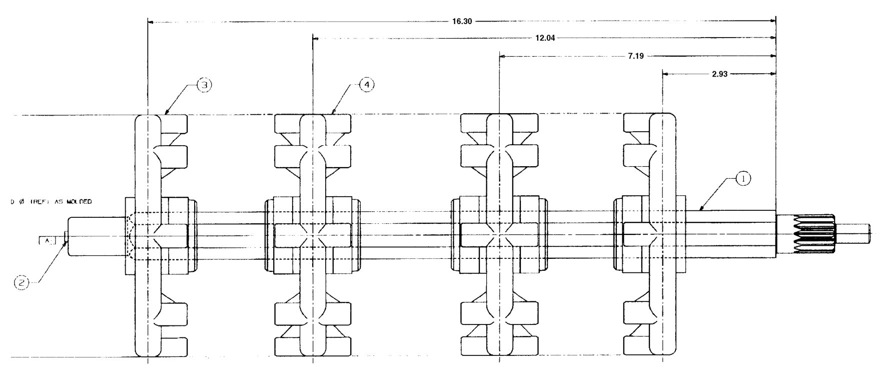
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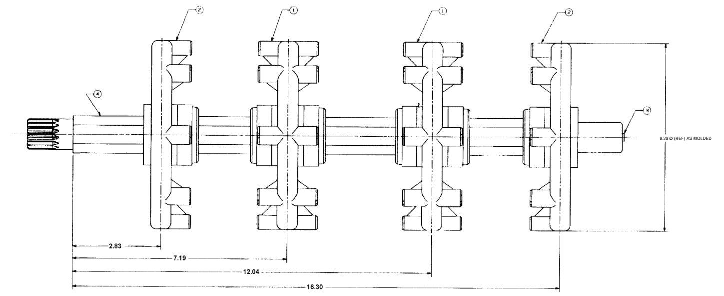
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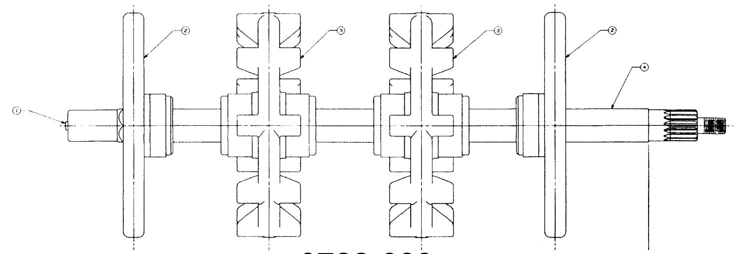
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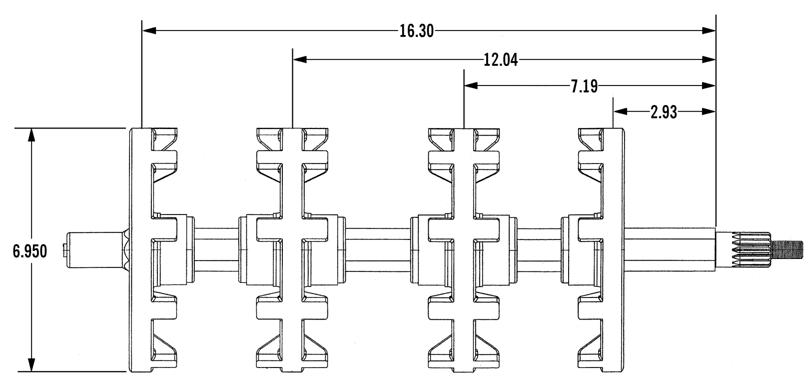
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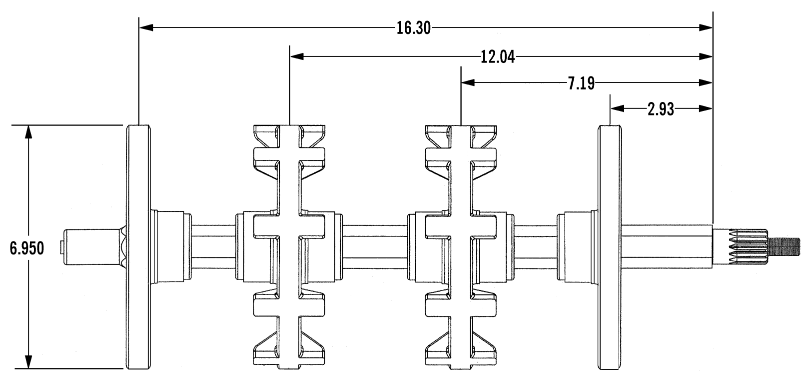
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9

DRIVE TRACK USAGE CHART (1984-2000)

Below is a listing of drive tracks for Arctic Cat snowmobiles. This chart lists each track with its specifications such as length, pitch, width, rail centers, and bar grip design.

From the information provided in this chart, note what other tracks can be substituted as a replacement track if a recommended track isn't available. Pay close attention to all critical specifications when choosing an alternative track. Do not select a track with a lower rating than the track being replaced.

P/N	Length	Width	Pitch	Rail Center	# Lugs in Center Belt	Bar Design	Rating	Lug Height
0102-294	121"	16"	3.29"	7.5"	Two	Regular	4	.610"
0102-314	151"	15"	2.52"	7.5"	Two	Regular	4	.610"
0602-001	156"	16"	2.52"	7.5"	Two	Regular	4	.610"
0602-116	121"	16"	2.52"	7.5"	Two	Regular	4	.610"
0602-239	121"	16"	2.52"	7.5"	Two	Full Block	2	.710"
0602-240	136"	16"	2.52"	7.5"	Two	Full Block	2	.710"
0602-241	156"	16"	2.52"	7.5"	Two	Full Block	2	.710"
0602-242	136"	15"	2.52"	8.84"	Two	Full Block	2	.710"
0602-247	116"	15"	2.52"	7.5"	Two	Full Block	2	.725"
0602-249	131"	15"	2.52"	7.5"	Two	Full Block	2	.710"
0602-252	151"	15"	2.52"	7.5"	Two	Full Block	2	.710"
0602-443	121"	15"	2.52"	8.84"	Four	Full Block	2	.725"
0602-478	121"	15"	2.52"	8.84"	Four	Full Block Clip	4	.710"
0602-534	136"	15"	2.52"	8.84"	Four	Full Block	2	.710"
0602-535	136"	15"	2.52"	8.84"	Four	Full Block	2	.710"
0602-753	121"	15"	2.52"	8.84"	Four	Full Block	2	.725"
0602-754	136"	15"	2.52"	8.84"	Four	Full Block	2	.725"
0602-725	156"	16"	2.52"	8.84"	Two	Full Block	2	.725"
0602-755	136"	15"	2.52"	8.84"	Four	Full Block	2	.725"
0602-677	121"	15"	2.52"	8.84"	Four	Full Block	4	.725"
0602-752	121"	15"	2.52"	8.84"	Two	Full Block	2	.725"
0602-756	136"	15"	2.52"	8.84"	Four	Full Block	4	.725"
0602-759	136"	15"	2.52"	8.84"	Four	Wave	4	.920"
0602-762	156"	16"	2.52"	8.84"	Two	Full Block	2	.725"
0602-798	121"	15"	2.52"	8.84"	Four	Full Block	4	.725"
0602-805	136"	15"	2.52"	8.84"	Four	Deep Lug	2	1.4"
0602-824	121"	15"	2.52"	8.84"	Four	Deep Lug	2	1.4"
0602-829	121"	15"	2.52"	8.84"	Four	Deep Lug	4	1.4"
*6799-841	121"	15"	2.52"	8.84"	Two	Deep Lug	4	2.0"
6799-842	136"	15"	2.52"	8.84"	Two	Deep Lug	4	2.0"
0602-861	156"	20"	2.52"	13.50"	Four	Full Block	4	.850"
0602-868	121"	15"	2.52"	8.84"	Two	Full Block	2	.725"
0602-869	136"	15"	2.52"	8.64"	Four	Deep Lug	4	1.4"
0602-904	136"	15"	2.52"	8.84"	Two	Deep Lug	4	1.6"
0602-905	136"	15"	2.52"	8.84"	Two	Deep Lug	4	2.0"
0602-921	121"	15"	2.52"	8.84"	Two	Full Block	4	.725"
0602-922	121"	15"	2.52"	8.84"	Two	Full Block	4	.725"
0602-923	121"	15"	2.52"	8.84"	Two	Full Block	4	.850"
0602-928	121"	15"	2.52"	8.84"	Two	Full Block	4	.725"
0602-962	156"	20"	2.52"	13.5"	Four	Full Block	4	1.0"
0602-935	156"	16"	2.52"	8.84"	Two	Full Block	4	1.0"
1602-004	121"	15"	2.52"	8.84"	Two	Full Block	4	.850"
1602-005	121"	15"	2.52"	8.84"	Four	Full Block	4	.850"
0602-153	115"	16"	2.52"	8.84"	Two	Full Block	2	.850"
1602-033	121"	15"	2.52"	8.84"	Four	Full Block	4	.850"
1602-008	121"	15"	2.52"	8.84"	Four	Aggressive Wave	4	1.25"
1602-647	136"	15"	2.52"	8.84"	Four	Aggressive Wave	4	N/A
6909-819	136"	15"	2.52"	8.84"	Four	Wave	4	1.25"
6799-800	136"	15"	2.52"	8.84"	Four	Wave	4	1.50"
0602-531	136"	15"	2.52"	8.84"	Four	Wave	2	.900"

* This track can only be used on AWS V chassis with a Torque Sensing Link Rear Suspension.

IDLER WHEEL SELECTION CHART

P/N	Diameter	I.D.	Insert Part Number		Width	Color Spoke
0114-209	4.25 in.	0.625 in.	0104-340	0104-341	0.75 in.	Not spoked
0114-159	5.00 in.	0.625 in.	0104-340	0104-341	1.05 in.	Not spoked
0114-245	5.25 in.	0.625 in.	0104-340	0104-341	1.00 in.	Not spoked
0604-004	5.35 in.	0.625 in.	0104-340	0104-341	1.00 in.	Not spoked
0604-225	5.35 in.	0.625 in.	0104-340	0104-341	1.12 in.	Chrome
0604-226	5.35 in.	0.625 in.	0604-220		1.33 in.	Chrome
0604-227	5.35 in.	0.625 in.	0604-220		1.33 in.	Gold
0604-235	5.35 in.	0.625 in.	0104-340	0104-341	1.12 in.	Gold
0604-332	5.35 in.	0.625 in.	0104-304	0104-341	1.12 in.	Black
0604-334	5.35 in.	0.625 in.	0604-220		1.33 in.	Black
0114-240	5.63 in.	0.625 in.	0104-340	0104-341	1.00 in.	Not spoked
0604-205	5.63 in.	.9843 in.	NONE		1.00 in.	Not spoked - has hole for wrench
0604-234	5.63 in.	0.625 in.	0604-220		1.33 in.	Gold
0604-239	5.63 in.	0.625 in.	0104-340	0104-341	1.12 in.	Gold
0604-240	5.63 in.	0.625 in.	0104-340	0104-341	1.12 in.	Chrome
0604-281	5.63 in.	0.625 in.	0604-220		1.33 in.	Silver
0604-327	5.63 in.	0.625 in.	0604-220		1.12 in.	Chrome
0604-328	5.63 in.	0.625 in.	0604-220		1.12 in.	Gold
0604-333	5.63 in.	0.625 in.	0604-220		1.12 in.	Black
0604-374	5.63 in.	.9843 in.	NONE		1.00 in.	Not spoked - S/A 0604-205 w/o hole
0604-450	5.63 in.	0.625 in.	0104-340	0104-341	0.875 in.	Not spoked - aluminum center
0604-459	5.63 in.	0.625 in.	0104-340	0104-341	1.00 in.	Not spoked
0604-981	5.63 in.	0.625 in.	0104-340	0104-341	1.12 in.	Green
0638-550	5.63 in.	0.625 in.	0104-340	0104-341	1.12 in.	Purple
0114-223	5.83 in.	0.750 in.	0104-342	0104-343	1.00 in.	Not spoked
0114-206	6.38 in.	0.625 in.	0104-340	0104-341	0.875	Not spoked - aluminum center
0114-210	6.38 in.	0.750 in.	0104-342	0104-343	1.00 in.	Not spoked
0604-210	6.38 in.	0.625 in.	0104-340	0104-341	1.00 in.	Not spoked
0604-222	6.38 in.	0.750 in.	0604-224		1.46 in.	Chrome
0604-223	6.38 in.	0.750 in.	0604-224		1.46 in.	Gold
0604-237	6.38 in.	0.625 in.	0604-220		1.46 in.	Gold
0604-238	6.38 in.	0.625 in.	0604-220		1.46 in.	Chrome
0604-331	6.38 in.	0.750 in.	0604-224		1.46 in.	Black
0604-670	6.38 in.	0.625 in.	0604-220		1.12 in.	Black
0604-969	6.38 in.	0.625 in.	0604-220		1.00 in.	Not spoked
0604-980	6.38 in.	0.625 in.	0604-220		1.12 in.	Green
0638-431	6.38 in.	0.750 in.	0604-224		1.46 in.	Purple
0104-298	7.125 in.	0.750 in.	0104-342	0104-343	.950 in.	Not spoked
0604-275	7.125 in.	0.625 in.	0604-220		1.46 in.	Silver
0604-276	7.125 in.	0.625 in.	0604-220		1.46 in.	Gold
0604-284	7.125 in.	0.625 in.	0104-341	0104-340	0.950 in.	Not spoked
0107-137	7.625 in.	0.750 in.	0104-342	0104-343	1.00 in.	Not spoked

Torque Specifications

REAR SUSPENSION		TORQUE
End Caps	ft-lb kg-m	8 1.1
Wear Strip/Rail	ft-lb kg-m	8 1.1
Idler Wheels (5/16-in. cap screw)	ft-lb kg-m	17 2.4
Idler Wheels (3/8-in. cap screw)	ft-lb kg-m	23 3.2
Mounting Block/Rail	ft-lb kg-m	23 3.2
Spring Slide Block/Rail	ft-lb kg-m	23 3.2
Offset Pivot Idler/Idler Arm	ft-lb kg-m	19 2.6
Rear Arm/Rail	ft-lb kg-m	23 3.2
Front Arm Mounting Bracket/ Rail	ft-lb kg-m	17 2.4
Front Arm/Mounting Brackets	ft-lb kg-m	30 4.2
Limiter Straps	ft-lb kg-m	8 1.1
Crossbrace/Rail	ft-lb kg-m	11 1.5
Shock Links	ft-lb kg-m	23 3.2
Shock Eyelets	ft-lb kg-m	23 3.2
Rear Arm/Idler Arm	ft-lb kg-m	23 3.2
Track Adjuster Bracket/Rail	ft-lb kg-m	11 1.5
Rear Arm Limiter/Rail	ft-lb kg-m	23 3.2
Skid Frame/Tunnel	ft-lb kg-m	23 3.2

REBUILDABLE SHOCK ABSORBER USAGE GUIDE

REAR SUSPENSION FRONT ARM				
Extended Length	**Collapsed Length**	**Part No.**	**Year**	**Model**
10.10	7.06	0604-430	1990	EXT Special
10.10	7.06	0604-473	1991	EXT Special, Prowler Special
10.10	7.06	0604-597	1992	EXT Special, Prowler Special
10.10	7.06	0604-597	1993	EXT 580Z
10.10	6.47	0604-651	1993	EXT 580Z
10.10	7.06	0604-698	1993	440 ZR, 580ZR
10.10	7.06	0604-770	1994	440 ZR*
10.10	7.06	0604-767	1994	440 ZR, 580ZR, 700ZR
10.10	7.06	0604-767	1995	580ZR, 600ZRT, 700ZR, 800 ZRT
10.10	7.06	0604-926	1995	440 ZR*
10.10	7.06	0604-767	1996	580ZR
10.10	7.43	1604-006	1996	600ZRT, 800ZRT
10.10	7.06	1604-036	1996	440ZR*, ZR 580 E.T.T.*
11.03	7.98	1604-163	1997	ZRT 800
11.03	7.98	1604-163	1997	ZRT 600
11.03	7.98	1604-163	1997	ZR 580 EFI
11.40	7.98	1604-113	1997	ZR 440*
11.40	7.98	1604-113	1998	ZR 440* (Consumer Model)
11.22	7.97	1604-379	1998	ZR 500
11.22	7.97	1604-379	1998	ZR 600, ZR 600 EFI
11.22	7.97	1604-379	1998	ZRT 600
11.22	7.97	1604-379	1998	ZRT 800
11.22	7.97	1604-379	1998	Thundercat, Thundercat M/C
11.22	7.97	1604-379	1998	Powder Special 600 EFI LE
11.40	7.98	1604-113	1998	ZR 600 EFI C.C.*
11.220	7.97	0704-384	1999	Powder Special 600 EFI LE, 700, 700 LE, ZRT 600, ZRT 800, Thundercat, ZR 500, ZR 500 EFI, ZR 600, ZR 600 EFI, ZR 700
11.400	7.98	1604-385	1999	ZR 500 LE*, ZR 500 EFI LE*, ZR 600 LE*, ZR 600 EFI LE*
11.220	7.970	0704-467	2000	Thundercat, Thundercat M/C, ZRT 600, ZRT 800, ZR 500, ZR 500 EFI, ZR 600, ZR 600 EFI, ZR 600 EFI LE (Reverse), ZR 700, ZR 700 LE (Reverse), Powder Special Models
11.470	7.980	0704-470	2000	ZR 600 EFI LE (Clicker), ZR 700 LE (Clicker)

* Remote Reservoir

REAR SUSPENSION REAR ARM				
Extended Length	**Collapsed Length**	**Part No.**	**Year**	**Model**
14.55	9.80	0604-427	1990	EXT Special
14.55	9.80	0604-476	1991	EXT Special, Prowler Special
14.55	9.80	0604-596	1992	EXT Special, Prowler Special
14.55	9.80	0604-652	1993	EXT 580Z
14.55	9.80	0604-699	1993	440 ZR, 580ZR
14.55	9.80	0604-768	1994	440 ZR, 580ZR, 700ZR
14.55	9.80	0604-768	1995	580ZR, 600ZRT, 700ZR, 800 ZRT
14.18	9.80	0604-931	1995	440 ZR
14.55	9.80	0604-768	1996	580ZR
14.73	9.88	1604-007	1996	600ZRT, 800ZRT
14.18	9.80	1604-035	1996	440ZR, ZR580 E.T.T.
14.35	9.88	1604-164	1997	ZRT 800
14.35	9.88	1604-164	1997	ZRT 600
14.35	9.88	1604-164	1997	ZR 580 EFI
14.28	10.03	1604-186	1997	ZR 440
14.28	10.03	1604-186	1998	ZR 440 (Consumer Model)
14.35	9.88	1604-382	1998	ZR 500
14.35	9.88	1604-382	1998	ZR 600, ZR 600 EFI
14.35	9.88	1604-382	1998	ZRT 600
14.35	9.88	1604-382	1998	ZRT 800
14.35	9.88	1604-382	1998	Thundercat, Thundercat M/C
14.35	9.88	1604-382	1998	Powder Special 600 EFI LE
14.28	10.03	1604-186	1998	ZR 600 EFI C.C.
14.35	9.88	0704-435	1999	Powder Special 600 EFI LE, 700, 700 LE, ZRT 600, ZR 500, ZR 500 LE, ZR 500 EFI, ZR 500 EFI LE, ZR 600, ZR 600 LE, ZR 600 EFI, ZR 600 EFI LE, ZR 700
14.28	10.30	0704-450	1999	ZRT 800, Thundercat
14.350	9.880	0704-468	2000	ZRT 600, ZR 500, ZR 500 EFI, ZR 600, ZR 600 EFI, ZR 600 EFI LE (Reverse), ZR 700, ZR 700 LE (Reverse), Powder Special Models
14.350	9.880	0704-469	2000	Thundercat, Thundercat M/C, ZRT 800
14.480	9.880	0704-475	2000	ZR 600 EFI LE (Clicker), ZR 700 LE (Clicker)

SKI SUSPENSION SHOCKS				
Extended Length	**Collapsed Length**	**Part No.**	**Year**	**Model**
10.03	7.07	0603-184	1990	EXT Special
14.28	9.38	0603-273	1991	EXT Special, Prowler Special
14.28	9.38	0603-419	1992	EXT Special, Prowler Special
14.28	9.50	0603-453	1993	EXT 580Z
13.10	8.87	0603-452	1993	440 ZR, 580ZR
13.06	8.87	0603-557	1994	440 ZR
14.02	8.87	0603-627	1995	440 ZR*
13.10	8.87	0603-563	1994, 95, 96	580 ZR
13.10	8.87	0603-560	1994, 95	700 ZR
13.10	8.87	0603-560	1995	600ZRT, 800ZRT
13.10	8.97	0603-708	1996	800ZRT
14.36	9.62	0603-685	1996	600ZRT
16.40	10.40	0603-717	1996	440ZR*
14.02	8.87	0603-735	1996	ZR580 E.T.T.
14.36	9.62	0603-896	1997	ZRT 800
14.36	9.62	0603-896	1997	ZRT 600
14.36	9.62	0603-896	1997	ZR 580 EFI
16.40	10.40	0603-717	1997	ZR 440*
16.40	10.40	0603-717	1998	ZR 440* (Consumer Model)
16.40	10.97	1603-027	1998	ZR 500
16.40	10.97	1603-027	1998	ZR 600, ZR 600 EFI
14.36	9.52	1603-176	1998	ZRT 600
14.36	9.52	1603-176	1998	ZRT 800
14.36	9.52	1603-176	1998	Thundercat, Thundercat M/C
16.40	10.97	1603-027	1998	Powder Special 600 EFI L.E.
16.40	10.40	0603-717	1998	ZR 600 EFI C.C.*
16.4	10.97	1603-027	1999	Powder Special 600 EFI LE, 700 LE
14.3	9.96	1603-218	1999	Powder Special 700
16.4	10.97	1603-027	1999	ZRT 600, ZRT 800, Thundercat, ZR 500
16.4	10.97	1603-027	1999	ZR 500 EFI, ZR 600, ZR 600 EFI, ZR 700
16.4	10.4	1603-193	1999	ZR 500 LE*, ZR 500 EFI LE*, ZR 600 LE*
16.4	10.4	1603-193	1999	ZR 600 EFI LE*
17.950	11.470	0703-666	2000	Thundercat, ZRT 600, ZRT 800, ZR 500, ZR 500 EFI, ZR 600, ZR 600 EFI, ZR 600 EFI LE (Reverse), ZR 700, ZR 700 LE (Reverse)
14.300	9.900	0703-672	2000	Powder Special 500 EFI LE, Powder Special 600 EFI LE, Powder Special 700, Powder Special 700 LE
16.400	10.970	0703-679	2000	Thundercat M/C
17.990	11.470	0703-716	2000	ZR 600 EFI LE (Clicker)*, ZR 700 LE (Clicker)*
17.990	11.470	0703-717	2000	ZR 600 EFI LE (Clicker)*, ZR 700 LE (Clicker)*

* Remote Reservoir w/Clicker

REBUILDABLE SHOCK ACCESSORY PART NUMBERS

1991 & Newer Shocks

P/N	DESC.	
0603-348	Valve, Shock	1.300 Dia. x .006 in. Thk.
0603-349	Valve, Shock	1.300 Dia. x .008 in. Thk.
0603-350	Valve, Shock	1.300 Dia. x .010 in. Thk.
0603-891	Valve, Shock	1.300 Dia. x .012 in. Thk.
0603-890	Valve, Shock	1.300 Dia. x .015 in. Thk.
0603-345	Valve, Shock	1.250 Dia. x .006 in. Thk.
0603-346	Valve, Shock	1.250 Dia. x .008 in. Thk
0603-347	Valve, Shock	1.250 Dia. x .010 in. Thk
0603-883	Valve, Shock	1.250 Dia. x .012 in. Thk.
0603-889	Valve, Shock	1.250 Dia. x .015 in. Thk.
0603-892	Valve, Shock	1.100 DIa. x .004 in. Thk.
0603-342	Valve, Shock	1.100 Dia. x .006 in. Thk
0603-343	Valve, Shock	1.100 Dia. x .008 in. Thk
0603-344	Valve, Shock	1.100 Dia. x .010 in. Thk
0603-882	Valve, Shock	1.100 Dia. x .012 in. Thk.
0603-888	Valve, Shock	1.100 Dia.x .015 in. Thk.
0603-893	Valve, Shock	1.000 Dia. x .004 in. Thk.
0603-339	Valve, Shock	1.000 Dia. x .006 in. Thk
0603-340	Valve, Shock	1.000 Dia. x .008 in. Thk
0603-341	Valve, Shock	1.000 Dia. x .010 in. Thk
0603-881	Valve, Shock	1.000 Dia. x .012 in. Thk
0603-887	Valve, Shock	1.000 Dia. x .015 in. Thk.
0603-894	Valve, Shock	.900 Dia. x .004 in. Thk.
0603-336	Valve, Shock	.900 Dia. x .006 in. Thk
0603-337	Valve, Shock	.900 Dia. x .008 in. Thk
0603-338	Valve, Shock	.900 Dia. x .010 in. Thk
0603-880	Valve, Shock	.900 Dia. x .012 in. Thk.
0603-886	Valve, Shock	.900 Dia. x .015 in. Thk.
0603-895	Valve, Shock	.800 Dia. x .004 in. Thk.
0603-333	Valve, Shock	.800 Dia. x .006 in. Thk
0603-334	Valve, Shock	.800 Dia. x .008 in. Thk
0603-335	Valve, Shock	.800 Dia. x .010 in. Thk
0603-879	Valve, Shock	.800 Dia. x .012 in. Thk.
0603-885	Valve, Shock	.800 Dia. x .015 in. Thk.
0603-731	Valve, Shock	.700 Dia. x .004 in. Thk
0603-330	Valve, Shock	.700 Dia. x .006 in. Thk
0603-331	Valve, Shock	.700 Dia. x .008 in. Thk
0603-332	Valve, Shock	.700 Dia. x .010 in. Thk
0603-878	Valve, Shock	.700 Dia. x .012 in. Thk.
0603-884	Valve, Shock	.700 Dia. x .015 in. Thk.

P/N	DESC.	
0603-204	Piston	.041 in. Orifice
0603-206	Piston	.059 in. Orifice
0603-207	Piston	.076 in. Orifice
0603-208	Piston	.078 in. Orifice
0603-209	Piston	.081 in. Orifice
0603-388*	Piston	.070 in. Orifice
0603-418	Piston	.043 in. Orifice
0603-512	Piston	.098 in. Orifice
0604-531*	Piston	.067 in. Orifice
0604-536	Piston	.052 in. Orifice
0603-551	Piston	.125 in. Orifice
0603-601	Piston	.093 in. Orifice
0604-627	Piston	.046 in. Orifice
0604-636	Piston	.067 in. Orifice
0604-741*	Piston	.093 in. Orifice
0604-742	Piston	.063 in. Orifice

■ **NOTE: Shock Oil (p/n 0636-664) is available from Arctic Cat Parts Department.**

SHOCK ABSORBER USAGE GUIDE

Below is a list of shock absorbers used on the front and rear suspensions of many Arctic Cat snowmobiles.

Specifications given for each shock absorber include collapsed and extended length, stroke, and both rebound and compression valving ratings.

When using the shock absorber guide, always select a shock absorber with the same length, both collapsed and extended. Shock valving selection will depend on personal preference.

P/N	Collapsed Length	Extended Length	Stroke	Rebound Valving	Compression Valving
0604-217	10.190"	16.250"	6.06"	3	1
0604-464	10.190"	16.250"	6.06"	2	3
0604-591	10.170"	16.250"	6.06"	1	2
0604-308	9.580"	15.020"	5.45"	1	2
0604-311	9.580"	15.020"	5.45"	4	3
0604-402	9.580"	15.020"	5.45"	3	4
0604-659	9.580"	15.020"	5.45"	2	1
0604-737	9.580"	15.020"	5.44"	2	2
0604-763	9.580"	15.020"	5.44"	4	3
0604-923	9.580"	15.020"	5.44"	1	1
0604-404	9.700"	15.020"	5.32"	3	3
0604-453	9.700"	15.020"	5.32"	2	2
0604-462	9.700"	15.020"	5.32"	1	1
0604-664	9.590"	14.020"	4.61"	2	2
0604-665	9.590"	14.020"	4.61"	1	1
0603-420	9.380"	14.280"	4.950"	2	3
0603-555	9.410"	13.540"	4.130"	1	1
0603-645	9.290	13.050"	3.760"	2	2
0604-755	7.060"	10.100"	3.040"	3	1
0604-533	7.060"	9.710"	2.650"	2	3
0604-599	7.060"	10.100"	3.040"	1	2
0603-792	9.830"	15.290"	5.46"	1	2
1604-102	9.560"	15.010"	5.45"	1	1
1604-101	7.670"	11.420"	3.75"	3	1
1604-196	7.670"	11.370"	3.70"	3	1
0603-117	7.060"	10.030"	2.97"	1	1
1604-093	7.670"	11.370"	3.70"	3	2
0603-758	9.830"	15.290"	5.47"	2	2
1604-369	8.420"	12.490"	4.07"	2	2

■ **NOTE: Rebound and compression valving is rated on a scale of 1 - 4 (1 being the stiffest and 4 being the softest).**

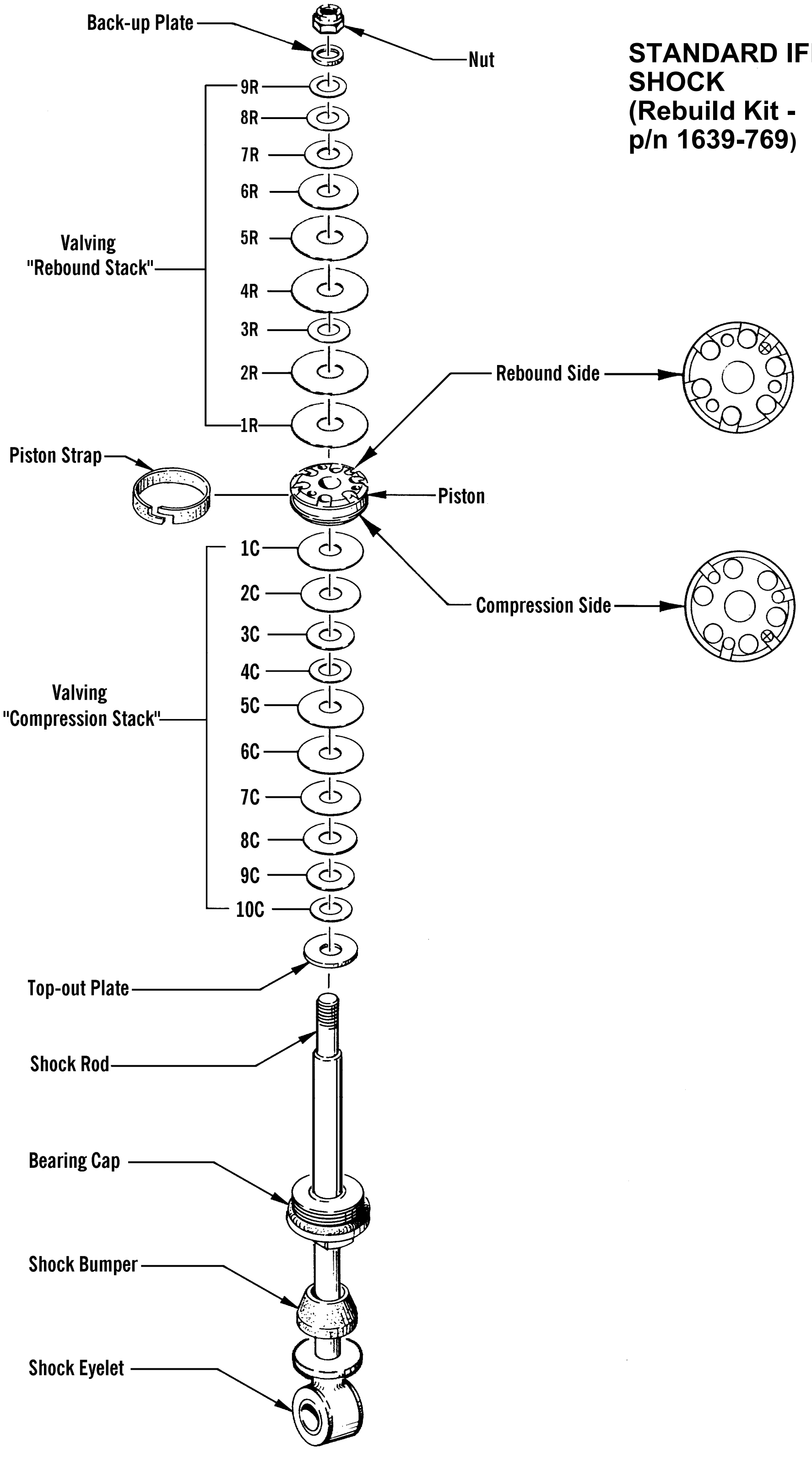
Ryde FX					
P/N	**Collapsed Length**	**Extended Length**	**Stroke**	**Rebound Valving**	**Compression Valving**
0604-756	9.590"	14.200"	4.61"	3	3
0604-757	9.590"	14.200"	4.61"	2	2
0604-758	9.590"	14.200"	4.61"	1	2
0604-909	9.550"	14.570"	5.020"	2	1
0603-649	9.560"	13.100"	3.840"	2	1
1604-001	9.550"	14.570"	5.020"	1	1
1604-011	9.550"	14.570"	5.020"	3	3
1604-092	9.580"	14.700"	5.12"	1	1
0604-997	7.490"	10.110"	2.87"	3	1
1604-085	10.590"	16.710"	6.12"	1	1
0603-843	9.460"	14.300"	4.85"	2	2
1604-176	9.540"	14.660"	5.12"	1	2
1604-212	9.540"	14.660"	5.12"	1	2
1604-218	10.570"	16.640"	6.07"	2	1
0603-901	9.940"	15.170"	5.24"	2	2
1603-172	9.960"	14.300"	4.35"	2	3
1603-173	9.080"	13.790"	4.47"	2	3
1603-174	10.460"	16.300"	5.85"	2	3
1603-175	11.330"	17.060"	5.73"	2	3
1604-368	8.380"	12.110"	3.74"	1	1
1604-370	10.550"	16.670"	6.12"	1	1
1604-371	9.550"	14.670"	5.12"	1	1
1604-372	9.550"	14.670"	5.12"	1	1
1603-200	9.080"	13.790"	4.47"	2	3
1603-201	9.960"	14.300"	4.35"	2	3

■ **NOTE: Rebound and compression valving is rated on a scale of 1 - 4 (1 being the stiffest and 4 being the softest).**

REBUILDABLE SHOCK REVALVING & REBUILDING SCHEMATICS

■ **NOTE: The following illustrations should be used as a reference for proper placement of the valves and the piston whenever a 2000 Arctic Cat rebuildable shock absorber is disassembled for the purpose of revalving or rebuilding.**

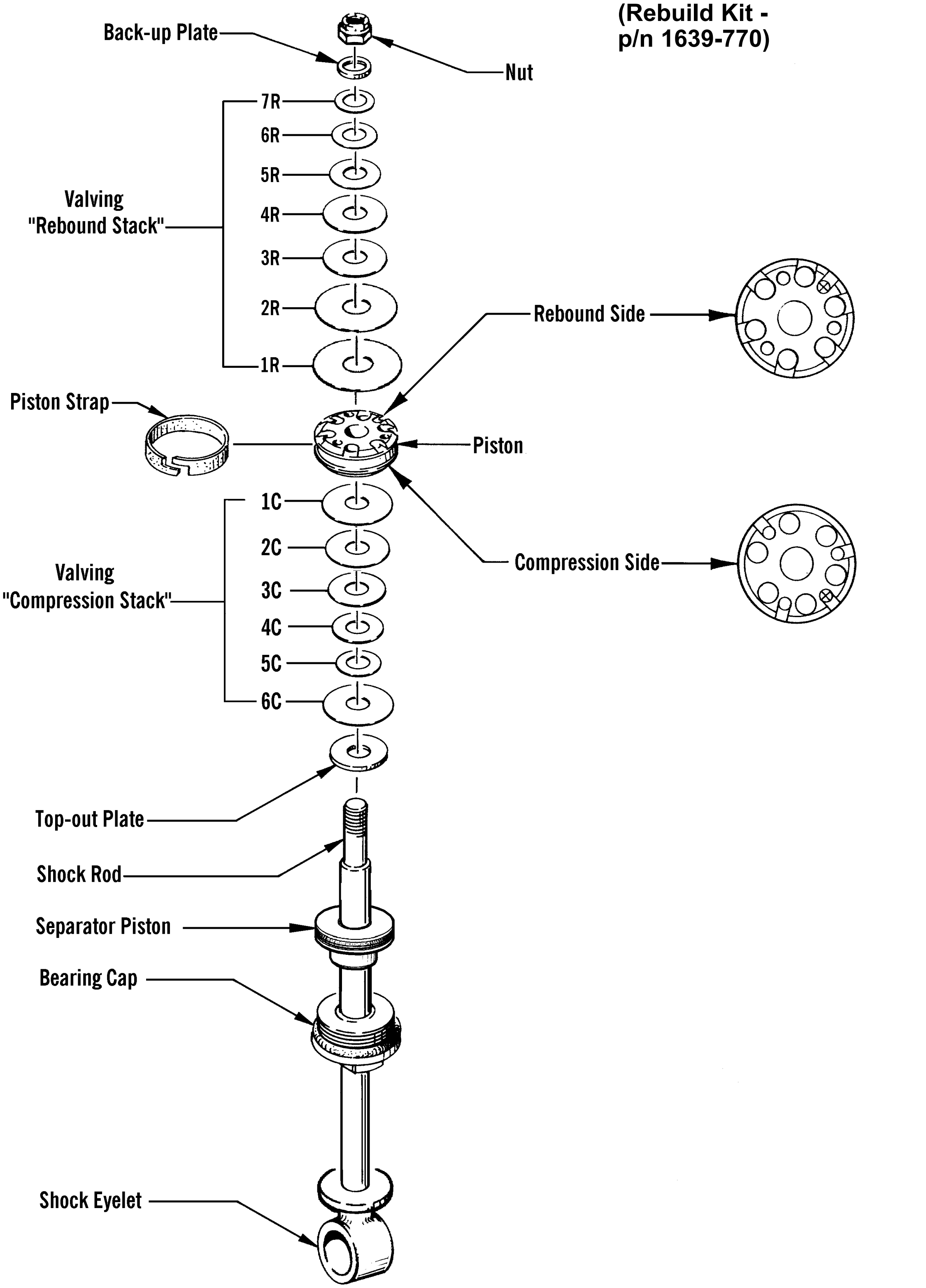
STANDARD IFP SHOCK (Rebuild Kit - p/n 1639-769)



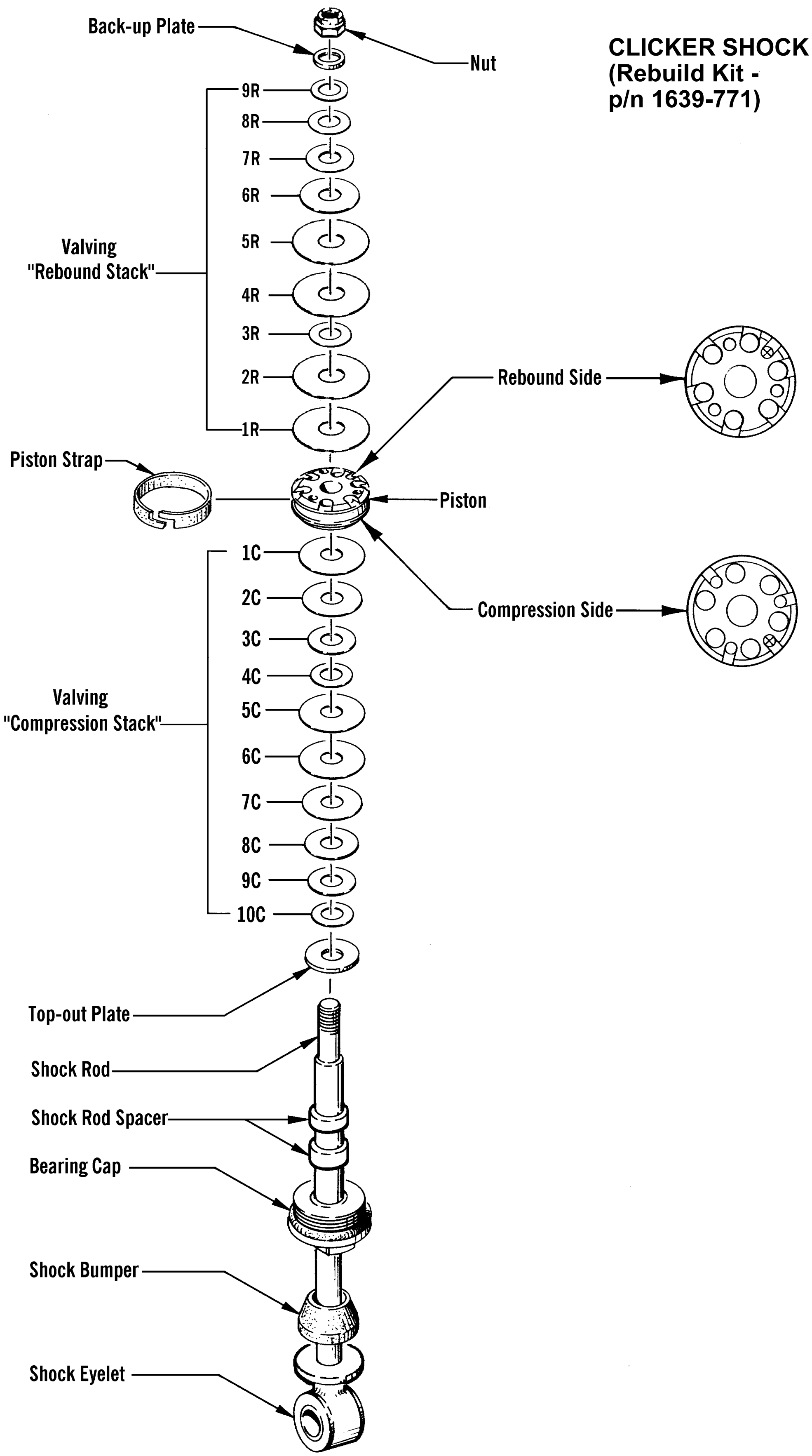
0735-329

9

ADJUSTABLE FRONT ARM SHOCK (Rebuild Kit - p/n 1639-770)



CLICKER SHOCK (Rebuild Kit - p/n 1639-771)



0735-327

9

OPTIONAL RIDE KITS

There are two optional ride kits available for the 1997 and 1998 snowmobiles manufactured with Fox shocks. The Consumer Ride kit listed will soften the suspension on the models listed. The Race Ride kits will stiffen the suspension on the models listed. The kits can be ordered from the Arctic Cat Parts Department.

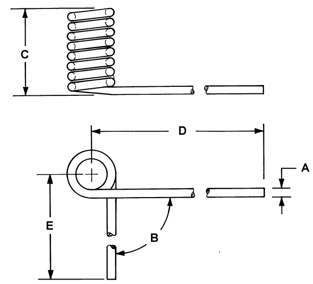
Application	Ride	Part No.
1997 - 1998 ZR 440, 1998 ZR 600 EFI C.C.	Consumer Ride	0639-535
1997 ZR 580, ZRT 600, ZRT 800	Race Ride	0639-534
1998 ZR 500, ZR 600, ZR 600 EFI, ZRT 600, ZRT 800, Thundercat, Powder Special 600 EFI L.E.	Race Ride	0639-961
1998 ZR 440 Sno-Pro	None Available	
2000 ZR 440 Sno-Pro	Consumer Ride	1639-614
All 2000 models equipped w/ACT Shock Absorbers (Except ZR 440 Sno-Pro)	Race Ride	1639-613

ARCTIC CAT REAR SPRING SELECTION CHART

Below is a complete list of rear suspension springs and specifications. This chart was compiled to assist technicians in fine-tuning the Arctic Cat rear suspension when the original springs are not satisfactory and a softer or firmer ride is desired.

If there are any questions concerning the charts usage, please contact the Arctic Cat Inc. Service Department.

Fig. 9-447



0730-218

REAR SUSPENSION SPRINGS						
P/N	Wire Diameter (A)	Angle (B)	Number of Coils	Coil Width (C)	Length (D)	Length (E)
0604-054/053	.406	65°	7.75	3.88	17.500	4.50
0604-118/117	.460	45°	9	4.75	17.500	4.50
0604-132/133*	.437	85°	9	5.030	16.500	5.75
0604-134/135*	.468	85°	9	5.030	16.500	5.75
0604-272/273	.437	90°	9	4.800	17.500	5.50
0604-282/283	.437	75°	9	4.800	17.500	5.50
0604-288/289	.460	60°	9	4.75	17.500	4.50
0604-290/291	.490	60°	9	5.020	17.500	4.50
0604-314/315**	.460	90°	9	5.030	17.500	5.50
0604-400/401	.406	90°	8.75	4.320	17.500	5.50
0604-454/455*	.437	90°	9	4.800	17.500	4.50
0604-474/475	.406	90°	7.75	3.880	17.500	4.50
0604-492/493	.406	90°	8.75	4.320	15.750	5.50
0604-584/585	.406	90°	8.75	4.320	18.100	5.70
0604-592/593	.460	83°	8.75	4.800	15.750	5.50
0604-654/655**	.437	90°	8.75	4.590	20.000	5.70
0604-660/661**	.437	90°	8.75	4.590	18.100	5.70
0604-746/747	.390	90°	8.75	4.320	19.750	5.70
0604-774/775*	.421	90°	8.75	4.430	18.100	5.70
0604-970/971*	.421	90°	8.75	4.430	15.900	5.70
1604-050/051**	.437	83°	8.75	4.590	16.000	5.70
1604-076/077**	.460	97°	9.00	4.530	16.000	5.70
1604-078/079**	.437	83°	8.75	4.56	21.000	5.70
1604-178/179**	.421	77°	8.75	4.52	20.000	6.00
1604-194/195**	.460	90°	8.75	4.53	16.000	6.70
1604-060/061**	.460	77°	8.75	4.85	20.000	5.50
1604-062/063**	.437	75°	8.75	4.60	18.000	5.50
1604-224/225**	.460	83°	8.75	4.53	21.000	5.70
1604-388/389**	.452	75°	8.75	4.60	18.000	5.50
1604-442/443	.452	90°	8.75	4.53	16.000	5.70
1604-067/066	.460	75°	8.75	4.83	18.000	5.50
1604-065/064	.421	75°	8.75	4.45	18.000	5.50
1604-608/609	.437	83°	8.75	4.59	20.750	5.70
1604-149/148***	.460	77°	8.75	4.84	22.000	8.00
1604-381/380***	.452	77°	8.75	4.97	22.000	8.00
1604-146/147***	.421	77°	8.75	4.52	22.000	8.00
1604-144/145***	.437	77°	8.75	4.52	22.000	8.00

***Long leg of spring is bent inward**
****Short leg of spring is bent inward**
*****Must be cut to correct length**

■ **NOTE: The wire diameter and length of the spring have a large influence over the valving of the shocks.**

FRONT SUSPENSION SKI SPRINGS

AWS MODELS

PART NUMBER	WIRE DIAMETER	FREE LENGTH INCHES	RATE LBS/INCH	# OF COILS	TAB
0603-279	.281	9.25	40	10	YES
0603-152	.281	11.35	43-53 Variable	13.5	YES
0603-400	.281	11.35	43-53 Variable	13.5	YES
0603-550	.312	11.75	60	12.5	YES
0603-260	.312	11.35	70	13.5	YES
0603-425	.312	11.35	70	13.5	NO
0603-277	.312	8.75	70-83 Variable	9	YES
0603-426	.331	11.35	80	13.5	NO
0603-430	.331	11.35	80	13.5	YES
0603-278	.328	8.25	85-100 Variable	9	YES
0603-090	.331	10.5	110	11	YES
0603-548	.420	10.5	110	12	NO
0603-663[1]	.331	10.5	110	11	YES
0603-665[2]	.331	10.5	110	11	YES
0603-709	.330	9.5	110	10	YES
0603-626	.307	9.14	115	9	YES
0603-650	.330	9.14	150	9	YES
0603-860	.312	9.50	110	7.5	YES
0703-482[2]	.312	9.50	110	7.5	YES
0603-836[2]	.306	11.50	80-125 Dual Rate	14	YES
0603-837	.306	11.50	80-125 Dual Rate	14	YES
0603-760	.313	9.15	110	10	NO
0603-602	.280	11.40	70	13	YES
0703-579[2]	.312	8.38	90	9	YES
0703-588[2]	.312	11.50	96	13	YES
0703-592[2]	.331	10.50	90	7.5	YES
0703-597[2]	.331	9.50	110	10.5	YES
0703-598[2]	.331	9.50	110	10.5	YES
0703-599[2]	.312	8.38	90	9	YES
1603-170	.331	10.5	90	7.5	YES
1603-197	.312	8.38	90	9.5	YES
1603-254	.331	9.5	110	10	NO
0703-630[2]	.331	9.5	110	10	NO
0603-718	.312	11.3	110	14	YES
1603-240[2]	.312	11.3	110	14	YES
1603-225	.312	12.25	95	14.9	YES
0703-620		10.50	90		
0703-619[2]	.312	12.25	95	14.9	YES
1603-275[3]	.312	12.61	80-120 dual rate	14.9	YES
1603-239	.281	10.50	90	11.34	YES
0703-620[2]	.281	10.50	90	11.34	YES

[1] Orange Color
[2] Green Color
[3] White Color

AFS MODELS

PART NUMBER	FREE LENGTH INCHES	RATE LBS/INCH
0603-196	2.75	250
0603-021	2.25	350
0603-132	7.25	375
0603-203	2.75	380
0603-127	7.25	420
0603-197	5.35	430
0603-019	5.25	520
0603-020	1.75	750
0603-173	2.00	750
0603-160	2.00	880

FRONT SUSPENSION SWAY BAR

PART NUMBER	DESCRIPTION	APPLICATION
0703-185	3/8 diameter	Powder Special 600 EFI L.E.
0703-202	7/16 diameter	All 1998 Models except Powder Special 600 EFI L.E., Cougar Models, and Panther 550
0703-193	1/2 diameter	1998 Cougar Models and Panther 550
0703-194	5/8 diameter	(Same as 0603-423)
0703-190	Chrome Moly	AWS
0603-024*	5/8 hex	AFS Models
0603-422*	1/2" diameter	1999-2000 Panther 550
0603-254*	7/16" diameter	All 1999-2000 models (AWS)
0603-423*	5/8" diameter	AWS Models I-V (Heavy duty)

* Unpainted

REAR SUSPENSION

(Front Arm Springs)

PART NUMBER	FREE LENGTH INCHES	RATE LBS/INCH
0604-216	7.75	100
0604-624	5.0	130*
0604-534	7.0	130
0604-413	7.0	130*
0604-740	7.0	170
0604-658	7.0	170*
0604-587	7.0	250
0604-697	7.1	275
0604-776	6.0	290
0604-005	14	20[1]
0604-171	15	25[1]
0604-006	12	150[1]
1604-125	7.0	220
1604-197	7.0	190
0603-860	9.50	110*
1603-018	9.50	90*
1603-267	8.5	110
1604-509	7.0	160 (.343 wire dia.)**
1604-445	7.0	180 (.360 wire dia.)**

* Tab on Bottom
[1] AFS Models
**This spring only fits shock (p/n 1604-480), non-adjuster sleeve shock

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Standard Shock & Spring Chart - 1999-2000 Models

1999-2000 Models	Front Suspension		Rear Suspension				Sway Bar
	Ski Shock	Ski Shock Spring (BLK/GRN)	Front Arm Shock	Front Arm Shock Spring	Rear Arm Shock	Rear Arm Spring (Right/Left)	
BEARCAT 340/440 I	0603-555	0603-426	0604-599	0604-740	0604-659	0604-654/655	N/A
BEARCAT 440 II	0603-555	0603-090	0604-599	0604-587	0604-923	1604-608/609	N/A
BEARCAT WIDE TRACK	1603-393	0603-090	0603-117	0604-587	0604-766	1604-608/609	N/A
PANTERA 580 EFI/1000	1603-175	1603-170	1604-368	0603-860	1604-460	1604-604/605	0603-254
PANTHER 340	1603-174	1603-293/0703-664	1604-369	0603-860	1604-370	1604-388/389	N/A
PANTHER 440	1603-174	1603-293/0703-664	1604-369	0603-860	1604-370	1604-388/389	N/A
PANTHER 550	1603-174	1603-170/0703-592	1604-369	0603-860	1604-460	1604-604/605	0603-422
POWDER SPECIAL 500 EFI/600/600 EFI	1603-264	0603-860/0703-482	1604-369	1603-018	1604-370	1604-062/063	N/A
POWDER SPECIAL 500 EFI LE/600 EFI LE	0703-679	0603-837/836	0704-467	1604-398	0704-468	1604-604/605	0603-254
POWDER SPECIAL 700/700 LE	0703-679	0603-837/836	0704-467	1604-398	0704-468	1604-604/605	0603-254
TRIPLE TOURING 600	1603-175	1603-170/0703-592	1604-368	0603-860	1604-460	1604-604/605	0603-254
Z 370	1603-253	1603-254/0703-630	1604-101	1603-171	1604-455	0604-654/655	N/A
Z 440	1603-253	1603-254/0703-630	1604-101	1603-171	1604-455	0604-654/655	0603-254
ZL Models	1603-175	1603-170/0703-592	1604-369	1603-018	1604-372	1604-062/063	0603-254
ZR 500/500 EFI/600/ 600 EFI/600 EFI LE (R)/700/700 LE (R)	0703-666	1603-391/392	0704-467	1604-509	0704-468	1604-050/051	0603-254
ZR 600 EFI LE (C)/700 LE (C)	0703-716/717	1603-391/392	0704-470	1604-658	0704-475	1604-442/443	0603-254
ZRT 600	0703-730	0603-718/1603-240	0704-384	0604-658	0704-435	1604-050/051	0603-254
ZRT 800/THUNDERCAT	0703-730	0603-718/1603-240	0704-384	0604-658	0704-450	1604-388/389	0603-254
THUNDERCAT M/C	0703-679	0603-718/1603-240	0704-467	1603-398	0704-468	1604-604/605	0603-254

Optional Rear Arm Spring Chart - 1999-2000 Models

Existing Spring	Optional Spring (Right/Left)
1604-388/389	L 1604-062/063 H 1604-060/061*
0604-654/655	L 1604-178/179 H 1604-060/061
1604-062/063	L 0604-774/775** H 1604-388/389
1604-050/051	L 0604-970/971 H 1604-076/077

* May have to shorten both legs of the spring.
** May have to shorten the short leg of the spring.

■ **NOTE:** **L** = Light **H** = Heavy

REBUILDABLE SHOCK PISTON DEPTH CHART

Model	Front Ski Suspension	Rear Suspension Front Arm	Rear Suspension Rear Arm
1996 ZR 440	1.360" (34.54 mm)	3.0"-3.5" (76.20-88.90 mm)	0.700" (17.78 mm)
1996 ZR 580	0.730" (18.54 mm)	0.600" (15.24 mm)	0.765" (19.43 mm)
1996 ZR 580 ETT	2.300" (58.42 mm)	3.0"-3.5" (76.20-88.90 mm)	0.700" (17.78 mm)
1996 ZRT 600	0.800" (20.32 mm)	0.600" (15.24 mm)	0.765" (19.43 mm)
1996 ZRT 800	0.730" (18.54 mm)	0.600" (15.24 mm)	0.765" (19.43 mm)
1997 ZR 440	1.360" (34.54 mm)	3.0"-3.5" (76.20-88.90 mm)	0.720" (18.29 mm)
1997 ZR 580	0.800" (20.32 mm)	0.600" (15.24 mm)	0.720" (18.29 mm)
1997 ZRT 600	0.800" (20.32 mm)	0.600" (15.24 mm)	0.720" (18.29 mm)
1997 ZRT 800	0.800" (20.32 mm)	0.600" (15.24 mm)	0.720" (18.29 mm)
1998 ZR 440 (Consumer Model)	1.360" (34.54 mm)	3.0-3.5" (76.20-88.90 mm)	0.720" (18.29 mm)
1998 ZR 500	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1998 ZR 600	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1998 ZRT 600	0.800" (20.32 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1998 ZRT 800	0.800" (20.32 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1998 Thundercat	0.800" (20.32 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1998 Thundercat M/C	0.800" (20.32 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1998 Powder Special EFI L.E.	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1998 ZR 600 EFI C.C.	1.360" (34.54 mm)	3.0-3.5" (76.20-88.90 mm)	0.720" (18.29 mm)
1999 Powder Special 600 EFI LE	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 Powder Special 700 LE	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 ZR 500	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 ZR 500 EFI	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 ZR 600	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 ZR 600 EFI	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 ZR 700	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 ZRT 600	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 Powder Special 700	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 Thundercat	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 ZRT 800	0.950" (24.13 mm)	0.650" (16.51 mm)	0.720" (18.29 mm)
1999 ZR 500 LE	1.360" (34.54 mm)	3.0-3.5" (76.20-88.90 mm)	0.720" (18.29 mm)
1999 ZR 500 EFI LE	1.360" (34.54 mm)	3.0-3.5" (76.20-88.90 mm)	0.720" (18.29 mm)
1999 ZR 600 LE	1.360" (34.54 mm)	3.0-3.5" (76.20-88.90 mm)	0.720" (18.29 mm)
1999 ZR 600 EFI LE	1.360" (34.54 mm)	3.0-3.5" (76.20-88.90 mm)	0.720" (18.29 mm)
2000 Powder Special 500 EFI LE/ 600 EFI LE	0.950" (24.13 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 Powder Special 700/700 LE	0.950" (24.13 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 ZR 500	1.250" (31.75 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 ZR 500 EFI	1.250" (31.75 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 ZR 600	1.250" (31.75 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 ZR 600 EFI/600 EFI LE (R)	1.250" (31.75 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 ZR 700/700 LE (R)	1.250" (31.75 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 ZRT 600	1.250" (31.75 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 Thundercat	1.250" (31.75 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 Thundercat M/C	0.880" (22.35 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 ZRT 800	1.250" (31.75 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 ZR 700 LE (C)	1.365" (34.67 mm)	3.000" (76.20 mm)	0.800" (20.32 mm)
2000 ZR 600 VEV	1.250" (31.75 mm)	0.650" (16.51 mm)	0.800" (20.32 mm)
2000 ZR 600 SE	1.365" (34.67 mm)	3.000" (76.20 mm)	0.800" (20.32 mm)
2000 ZR 600 EFI LE (C)	1.365" (34.67 mm)	3.000" (76.20 mm)	0.800" (20.32 mm)

REBUILDABLE SHOCK TOOLS REQUIRED

0644-268	Shock Bearing Cap Installation Tool
0644-057	Shock Spring Removal Tool
0644-158	Shock Inflation Needle
0644-142	Gas Shock Retaining Blocks
0644-162	Replacement Needle
0644-169	Shock Piston Location Tool
0644-151	Nitrogen Regulator
0644-277	Shock Rod Clamping Tool

REBUILDABLE SHOCK REBUILD KITS

1639-769	IFP
1639-770	Front Arm Quick-Adjust
1639-771	Clicker Shock

1999-2000 VALVE STACKS

Thundercat, ZRT 600, ZRT 800, ZR 500, ZR 500 EFI, ZR 600, ZR 600 EFI, ZR 600 EFI LE (Reverse), ZR 700, ZR 700 LE (Reverse)

Ski Suspension Shock (p/n 0703-666)

Compression:		Rebound:	
11.	1.125 x .010	1.	1.250 x .006
10.	.800 x .010	2.	1.250 x .006
9.	.900 x .010	3.	.900 x .006
8.	1.000 x .008	4.	1.250 x .008
7.	1.100 x .008	5.	1.250 x .008
6.	1.250 x .006	6.	1.100 x .010
5.	1.250 x .006	7.	1.000 x .010
4.	.700 x .008	8.	.900 x .010
3.	.900 x .006	9.	.800 x .010
2.	1.100 x .006	10.	.620 x .094
1.	1.300 x .006		

Piston Orifice .093 in.

Thundercat, Thundercat M/C, ZRT 600, ZRT 800, ZR 500, ZR 500 EFI, ZR 600, ZR 600 EFI, ZR 600 EFI LE (Reverse), ZR 700, ZR 700 LE (Reverse), Powder Special Models

Front Arm Track Suspension Shock (p/n 0704-467)

Compression:		Rebound:	
7.	1.125 x .094	1.	1.250 x .010
6.	1.250 x .010	2.	1.100 x .010
5.	.800 x .010	3.	1.000 x .010
4.	.900 x .010	4.	1.000 x .010
3.	1.000 x .012	5.	.900 x .010
2.	1.100 x .012	6.	.800 x .010
1.	1.300 x .012	7.	.700 x .010
		8.	.620 x .094

Piston Orifice .059 in.

ZRT 600, ZR 500, ZR 500 EFI, ZR 600, ZR 600 EFI, ZR 600 EFI LE (Reverse), ZR 700, ZR 700 LE (Reverse), Powder Special Models

Rear Arm Track Suspension Shock (p/n 0704-468)

Compression:		Rebound:	
8.	1.125 x .094	1.	1.250 x .010
7.	.900 x .010	2.	1.250 x .010
6.	1.000 x .010	3.	1.100 x .010
5.	1.100 x .010	4.	1.000 x .010
4.	1.250 x .010	5.	.900 x .010
3.	.900 x .010	6.	.800 x .010
2.	1.000 x .010	7.	.620 x .094
1.	1.300 x .006		

Piston Orifice .046 in.

Thundercat M/C

Ski Suspension Shock (p/n 0703-679)

Compression:		Rebound:	
11.	1.125 x .094	1.	1.250 x .006
10.	.800 x .010	2.	1.250 x .006
9.	.900 x .010	3.	.900 x .006
8.	1.000 x .008	4.	1.250 x .008
7.	1.100 x .008	5.	1.250 x .008
6.	1.250 x .006	6.	1.100 x .010
5.	1.250 x .006	7.	1.000 x .010
4.	.700 x .004	8.	.900 x .010
3.	.900 x .008	9.	.800 x .010
2.	1.100 x .008	10.	.620 x .094
1.	1.300 x .006		

Piston Orifice .093 in.

ZR 600 EFI LE (Clicker), ZR 700 LE (Clicker)

Front Arm Track Suspension Shock (p/n 0704-470)

Compression:		Rebound:	
7.	1.250 x .094	1.	1.250 x .010
6.	1.250 x .010	2.	1.100 x .010
5.	.800 x .010	3.	1.000 x .010
4.	.900 x .010	4.	1.000 x .010
3.	1.000 x .012	5.	.900 x .010
2.	1.100 x .012	6.	.800 x .010
1.	1.300 x .012	7.	.700 x .010
		8.	.620 x .094

Piston Orifice .059 in.

Thundercat, Thundercat M/C, ZRT 800

Rear Arm Track Suspension Shock (p/n 0704-469)

Compression:		Rebound:	
8.	1.125 x .094	1.	1.250 x .010
7.	.900 x .010	2.	1.250 x .010
6.	1.000 x .010	3.	1.100 x .010
5.	1.100 x .010	4.	1.000 x .010
4.	1.250 x .010	5.	.900 x .010
3.	.900 x .010	6.	.800 x .010
2.	1.000 x .010	7.	.620 x .094
1.	1.300 x .006		

Piston Orifice .041 in.

ZR 600 EFI LE (Clicker), ZR 700 LE (Clicker)

Ski Suspension Shock (p/n 0703-716-R & 717-L)

Compression		Rebound:	
11.	1.250 x .094 (L)	1.	1.250 x .006
	1.125 x .094 (R)	2.	1.250 x .006
10.	.800 x .010	3.	.900 x .006
9.	.900 x .010	4.	1.250 x .008
8.	1.000 x .008 (L)	5.	1.250 x .008
	1.100 x .008 (R)	6.	1.100 x .010
7.	1.100 x .008	7.	1.000 x .010
6.	1.250 x .006	8.	.900 x .010
5.	1.250 x .006	9.	.800 x .010
4.	.700 x .008	10.	.620 x .094
3.	.900 x .006		
2.	1.000 x .006		
1.	1.300 x .006		

Piston Orifice .093 in.

ZR 600 EFI LE (Clicker), ZR 700 LE (Clicker)

Rear Arm Track Suspension Shock (p/n 0704-475)

Compression:		Rebound:	
8.	1.250 x .094	1.	1.250 x .010
7.	.900 x .010	2.	1.250 x .010
6.	1.000 x .010	3.	1.250 x .010
5.	1.100 x .010	4.	1.100 x .010
4.	1.250 x .010	5.	1.000 x .010
3.	.900 x .010	6.	.900 x .010
2.	1.000 x .010	7.	.800 x .010
1.	1.300 x .008	8.	.620 x .094

Piston Orifice .041 in.

Powder Special 500 EFI LE, Powder Special 600 EFI LE, Powder Special 700, Powder Special 700 LE

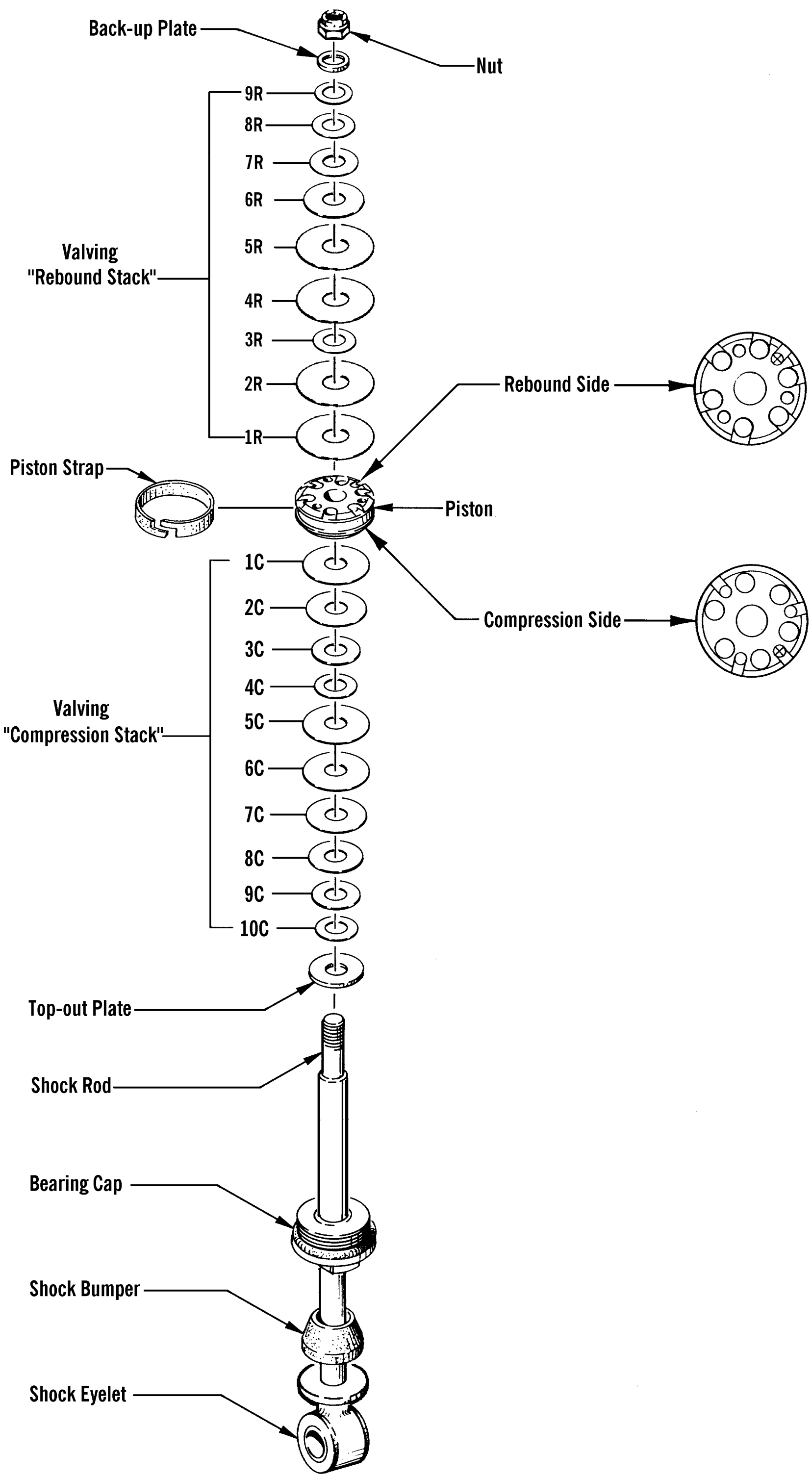
Ski Suspension Shock (p/n 0703-672)

Compression:		Rebound:	
10.	1.125 x .094	1.	1.250 x .006
9.	.800 x .010	2.	1.250 x .008
8.	.900 x .010	3.	1.250 x .006
7.	1.000 x .008	4.	1.250 x .008
6.	1.100 x .008	5.	1.100 x .008
5.	1.250 x .006	6.	1.000 x .010
4.	1.250 x .008	7.	.900 x .010
3.	.900 x .010	8.	.800 x .010
2.	1.100 x .010	9.	.620 x .094
1.	1.300 x .008		

Piston Orifice .093 in.

Servicing I.F.P. Style Shocks

■ **NOTE: The following illustration should be used as a reference for proper placement of the valves and the piston whenever a rebuildable shock is disassembled for the purpose of revalving or rebuilding.**



0735-329

> ⚠ **WARNING**
>
> **Before servicing a gas shock absorber, first discharge all pressure from the shock. Remove the screw from the bottom of the shock and insert the Shock Inflation Needle (p/n 0644-158). Open valve until all pressure is released. Failure to do this may cause personal injury.**

DISASSEMBLING

1. Remove the shock from the snowmobile.
2. Wash the shock body in parts cleaner; then dry with compressed air to remove sand and dirt.

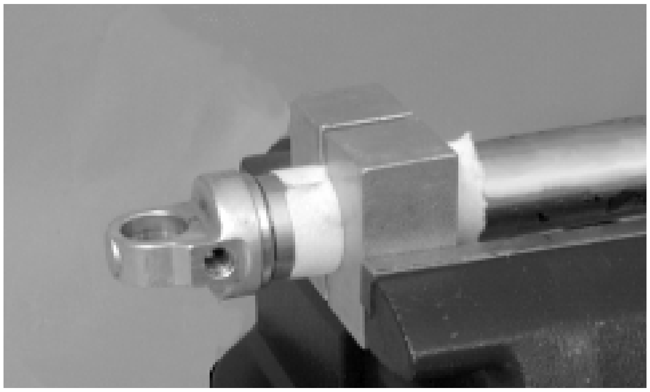
> ⚠ **WARNING**
>
> **When using compressed air to dry components, always wear safety glasses.**

3. Place the shock into the Gas Shock Retaining Blocks (p/n 0644-142); then remove shock eyelet mounting axle and bushings from end cap.

> ⚠ **CAUTION**
>
> **It is important that the Gas Shock Retaining Blocks (p/n 0644-142) are used during both disassembly and assembly. Any other method of securing the shock body during these procedures may deform the shock body cylinder.**

■ NOTE: A paper shop towel between the shock body and retaining blocks will help prevent scuffing of the shock body.

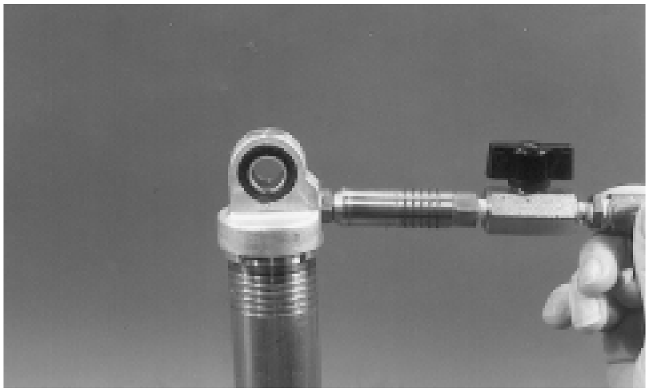
Fig. 9-448



AP110DA

4. Remove the screw from the bladder housing on the bottom of the shock. Discharge all the pressure from the shock using the Shock Inflation Needle (p/n 0644-158). Open the valve in filler handle until all pressure is released.

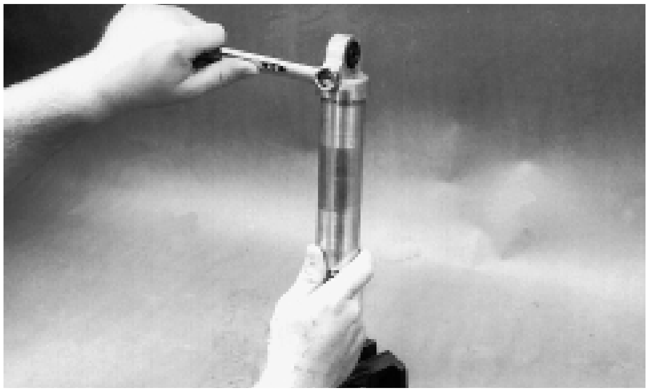
Fig. 9-449



AG335

5. Using a 9/16-in. wrench, remove the brass bladder housing from the lower end cap. Account for an O-ring.

Fig. 9-450

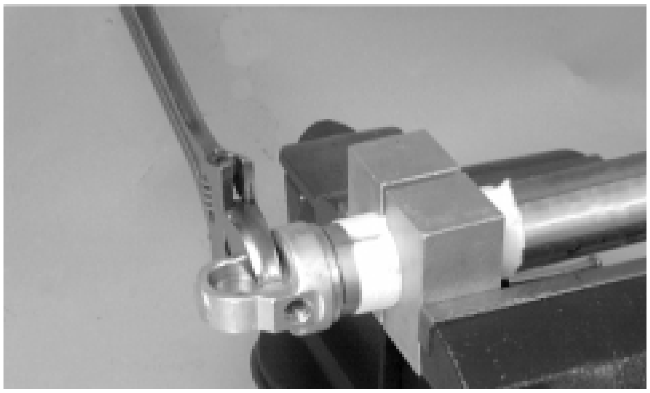


AP014

6. Using a large adjustable wrench (12-in. or 14-in.), remove the end cap.

■ NOTE: 1994 and older shocks have Loctite on the lower end cap. Heating the lower end cap may be necessary. Use care not to overheat.

Fig. 9-451



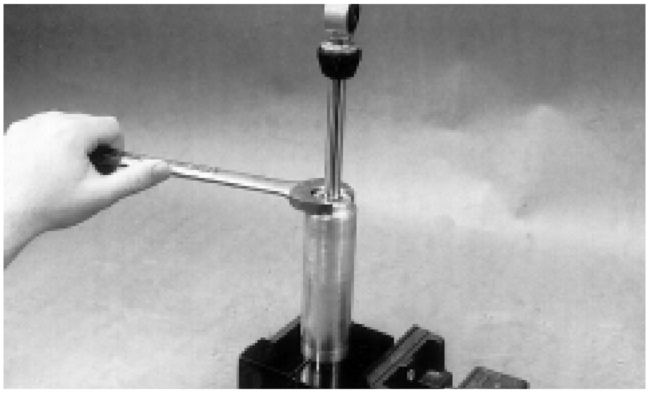
AP016DA

9

7. Using a 1-in. open end wrench, loosen the shock shaft bearing cap a couple of turns.

■ NOTE: Do not remove the bearing cap at this time.

Fig. 9-452



AP026

8. Turn the shock so that the open end is up. Then remove the Allen-head screw located in the center of the floating piston. Account for a small O-ring.

Fig. 9-453



AP022

9. Using a pair of pliers, pull the floating piston assembly out of the shock body. Account for a piston ring and an O-ring.

10. Pour the oil out of the shock body.

11. Unscrew the shaft bearing cap and lift the shaft assemble from the shock body.

Fig. 9-454



AP027

12. Clean the inside of the shock body using clean parts-cleaning solvent. Blow dry using compressed air.

■ NOTE: Do not lay shock parts on a rag as it may transfer lint to the parts causing internal shock problems.

⚠ WARNING

When using compressed air to dry components, always wear safety glasses.

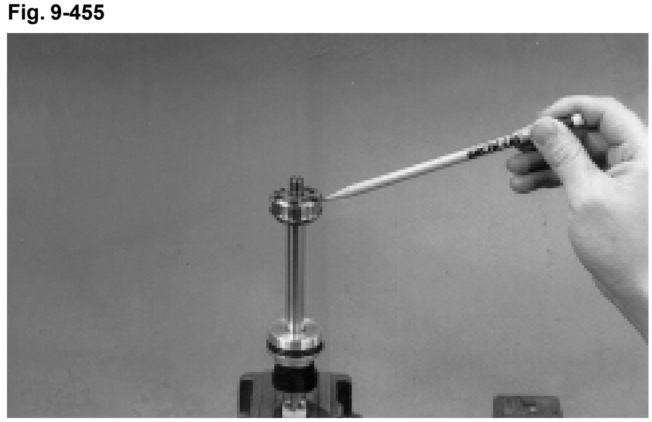
13. Remove the piston ring from the piston. Loosen (but do not remove) the lock nut from the bottom of the shock shaft; then clean the piston area with clean parts-cleaning solvent to remove dirt or foreign material from between the valves. Dry the piston and valves completely using compressed air.

⚠ WARNING

When using compressed air to dry components, always wear safety glasses.

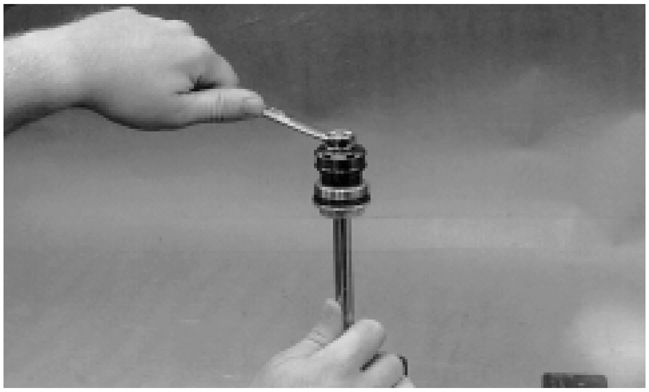
■ NOTE: If for some reason the piston must be removed from the shock shaft, it must be installed with its large seven slots located next to the lock nut side of the shock shaft.

Fig. 9-455



AP051

Fig. 9-456



AP028

■ **NOTE: If shock valving must be removed for cleaning, remove all valving as a complete assembly and place on a 5/16 x 3-in. cap screw to keep in proper order. Note which side is the top side for assembly purposes.**

Fig. 9-457



AP032

14. Items to inspect:
    A. Shock shaft for straightness, nicks, or burrs.
    B. Shaft bearing end cap — clean, inspect, or replace.
    C. Inside of shock body for scratches, burrs, or excessive wear.
    D. Piston rings for cuts, chipped or nicked edges, or excessive wear.
    E. O-rings for nicks, cuts, or cracks.
    F. Valves for kinks or waves.
    G. Rubber damper (ski shocks only) for chipping, cracking, or being missing.

15. Items to replace:
    A. Bleed screw O-ring on the floating piston.
    B. Shock shaft bearing cap if any signs of oil leaks or damage.
    C. Any part worn or damaged.

■ **NOTE: For shaft, shaft eyelets, or shaft bearing cap replacement, see Shaft Eyelet or Bearing Cap and Shaft Seal sub-section.**

ASSEMBLING

1. Place the shock shaft eyelet into the vise; then assemble valves and piston and tighten the lock nut to 2.1-2.8 kg-m (15-20 ft-lb).

> **⚠ CAUTION**
>
> **DO NOT OVER-TIGHTEN. If excessive torque is applied, damage to the piston and valves will occur.**

2. Place the shock body between the two Gas Shock Retaining Blocks (p/n 0644-142) and secure in a vise.

> **⚠ CAUTION**
>
> **It is important that the Gas Shock Retaining Blocks (p/n 0644-142) are used during both disassembly and assembly. Any other method of securing the shock body during these procedures may deform the shock body cylinder.**

3. Apply a light coat of oil on the O-ring and piston ring and install piston into shock body.

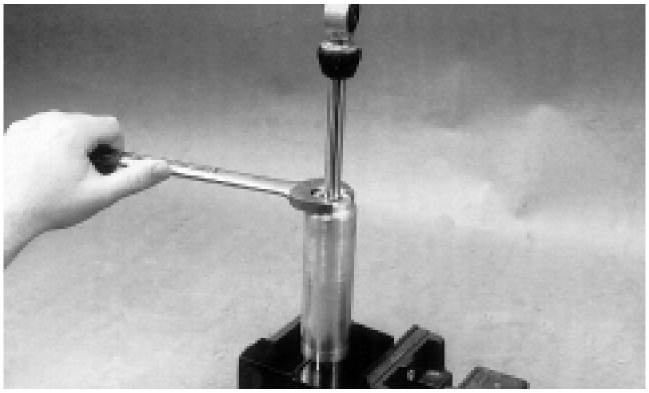
Fig. 9-458



AP033

4. Place the shaft bearing cap into the body and tighten securely.

Fig. 9-459



AP026

9

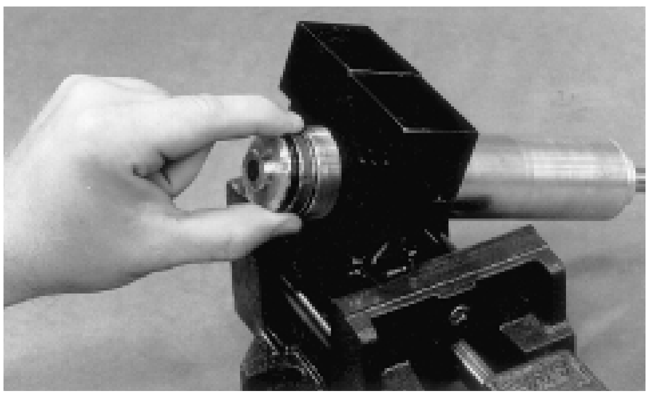
5. Loosen vise and reposition the shock body and retaining blocks so the bottom of the shock body is "up" and in a vertical position. Extend the shock shaft fully and fill the shock body with Shock Oil (p/n 0636-664) to within 1-1 1/2-in. from the top.

6. Slowly move the shock shaft up and down a few times keeping the piston under oil at all times. This is to remove the air from under the piston. Extend the shock shaft fully; then fill the shock body with oil to within 1/2-3/4-in. from the top.

■ **NOTE: After filling the shock body with oil, allow 5 minutes for all air bubbles to rise to the top.**

7. Apply a light coat of oil on the floating piston ring and O-ring and install the floating piston in the shock body.

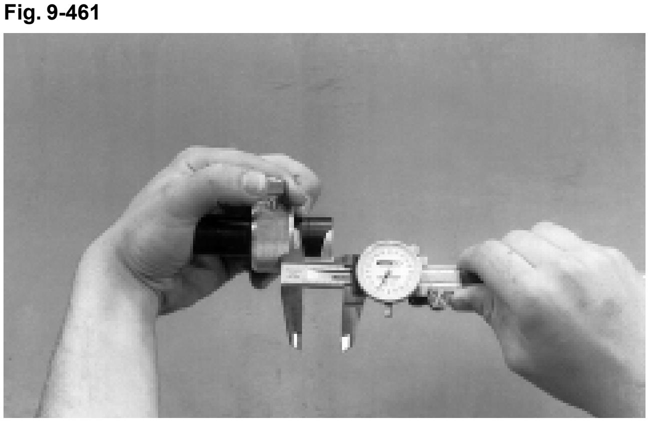
Fig. 9-460



AP023

■ **NOTE: Depending on which shock absorber is being worked on, adjust the piston location tool to the specification indicated in piston depth chart (see page 9-149).**

Fig. 9-461



AP050

8. Attach the Shock Piston Location Tool (p/n 0644-169) to the piston by placing its slotted end over the flats on the top of the piston and giving the tool a quarter turn. Pull gently on the tool to make sure it is secure to the piston.

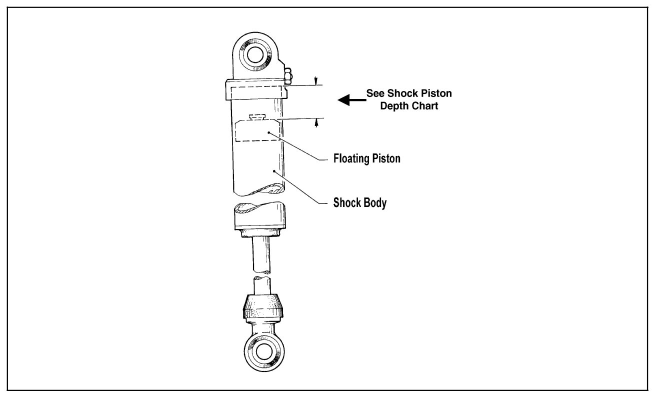
Fig. 9-462



AG339

9. Using the tool as a handle, push the piston down into the shock body until the adjustment knob comes in contact with the shock body. Give the tool a quarter turn to free it from the piston. The piston should now be located correctly.

Fig. 9-463



729-085C

■ **NOTE: As the floating piston is pushed into the shock absorber body, air and excess oil will come out through the hole in the piston. If no oil comes out through the hole in the piston, remove the piston and add more oil to the shock body.**

10. Install the Allen-head screw and O-ring into the bottom of the floating piston. While securing the piston with a 9/16-in. wrench, tighten the Allen-head screw.

Fig. 9-464



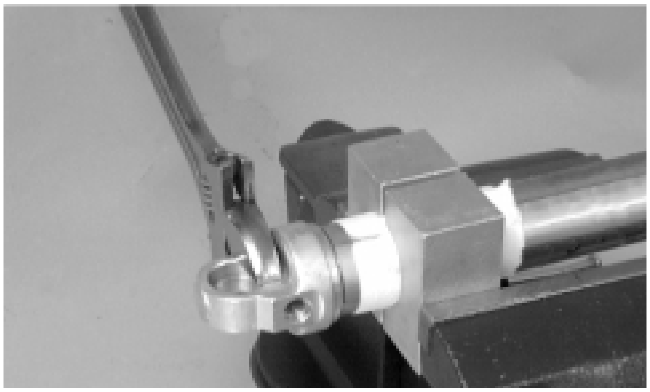
AP020

11. Pour out the excess oil from the shock body.

12. Install the lower end cap on the shock body.

13. Using Shock Retaining Blocks (p/n 0644-142) to hold the shock in place and using an adjustable wrench, tighten the end cap securely.

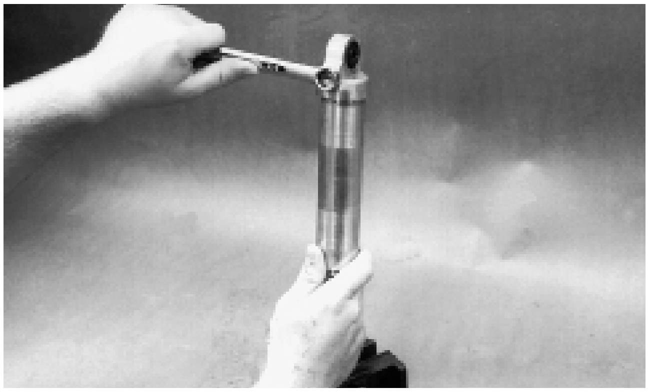
Fig. 9-465



AP016DA

14. Apply a light coat of oil on the bladder housing O-ring; then install the brass bladder housing into the lower end cap. Tighten securely.

Fig. 9-466



AP014

15. Pressurize the shock (see Pressurizing Rebuildable Shocks sub-section). After shock has been pressurized, install screw into bladder housing. Tighten securely.

16. Install shock eyelet bushings and axle.

Servicing Front Arm Quick-Adjust Shock

REMOVING

1. Remove the shock from the snowmobile.

■ **NOTE: When removing the shock from the snowmobile, it will be necessary to disconnect the adjuster assembly. Before disconnecting the adjuster, the adjustment knob must be turned completely open (counterclockwise) so there is no pressure on the line. To prevent oil spillage, place a protective cap on the hose end.**

2. Wash the shock body in parts-cleaning solvent; then dry with compressed air to remove sand and dirt.

Fig. 9-467



AG807

⚠ WARNING

When using compressed air to dry components, always wear safety glasses.

DISASSEMBLING

⚠ WARNING

Before any work can be performed on the gas shock absorber, first discharge all pressure from the shock remote reservoir. Remove the valve screw from the pressure valve and insert the Shock Inflation Needle (p/n 0644-158). Open valve until all pressure is released. Failure to do this may cause personal injury.

1. Using the Shock Retaining Blocks (p/n 0644-142), place the remote reservoir in a vise.

9

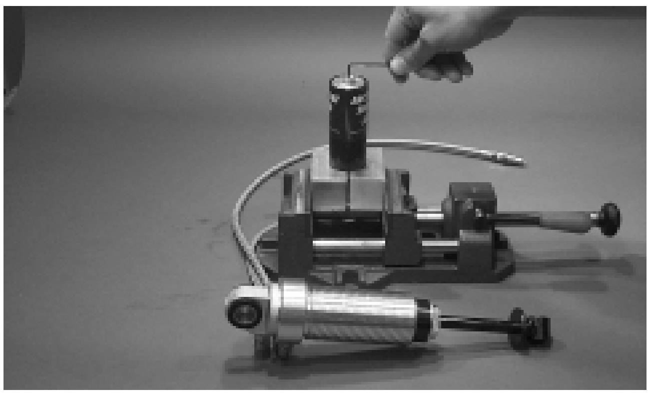
Fig. 9-468



AG808

2. Remove the valve screw from the pressure valve.

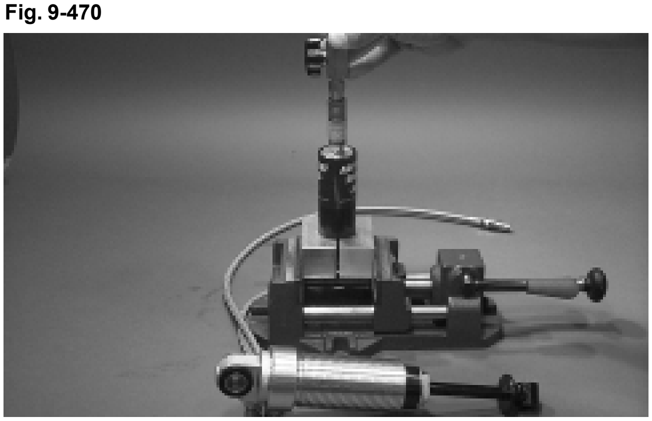
Fig. 9-469



AG809

3. Discharge all pressure from the remote reservoir using the Shock Inflation Needle (p/n 0644-158). Open the valve in the filler handle until all pressure is released.

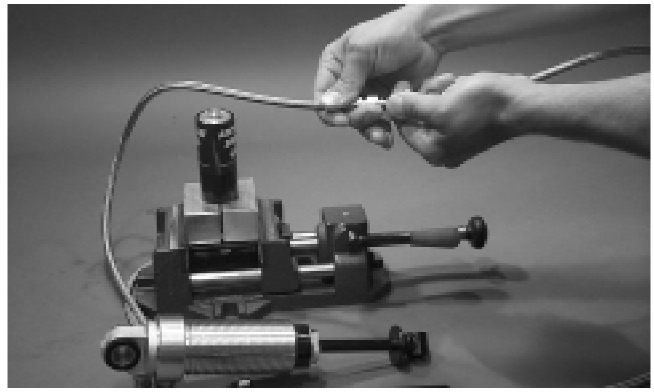
Fig. 9-470



AG810

4. Reattach the adjustment knob assembly to the shock adjuster hose.

Fig. 9-471



AG811

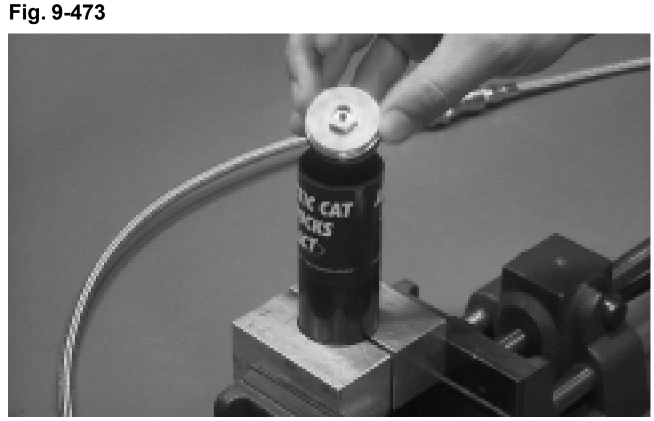
5. Push the remote reservoir end cap in; then use a sharp tool to remove the circlip. Remove the remote reservoir end cap.

Fig. 9-472



AG812

Fig. 9-473

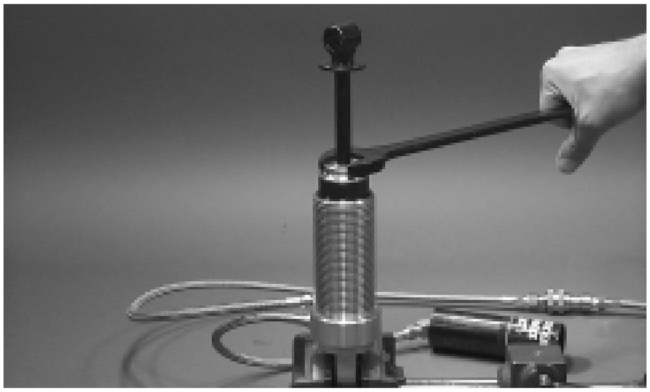


AG813

6. Secure the shock body eyelet in a vise; then loosen the shock end cap and carefully remove the shock rod with valving assembly.

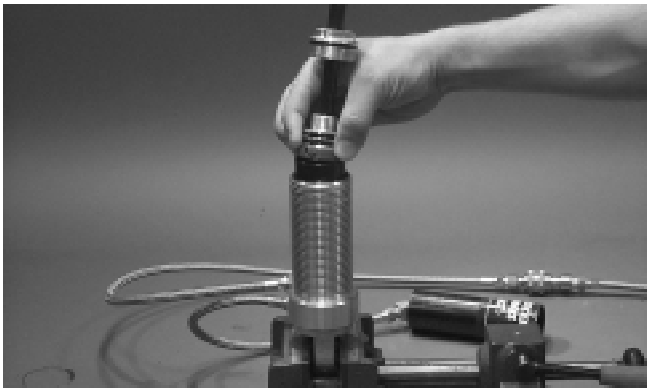
■ **NOTE: If the shock body turns with the upper end cap, the shock body can be removed from the lower end cap; then remove the outer sleeve and place the shock body in the shock blocks. Remove the upper end cap.**

Fig. 9-474



AG814

Fig. 9-475



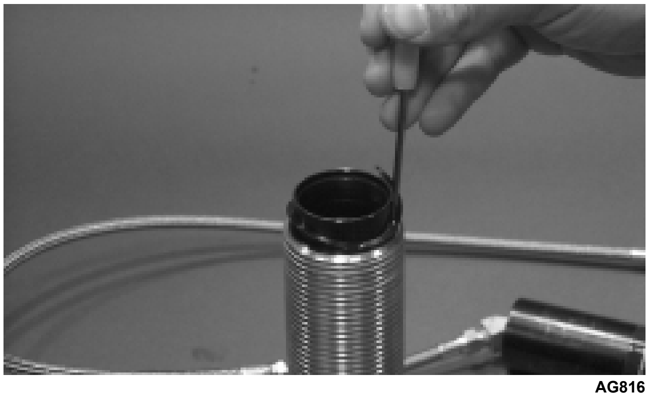
AG815

■ **NOTE: If for some reason the piston must be removed from the shock shaft, it must be installed with the "Rebound Side" located next to the lock nut of the shock shaft (refer to schematic on page 9-152).**

■ **NOTE: Do not remove the lock nut from the bottom of the shock rod as it is very important the valving on either side of the piston stay in its proper position. If shock valving must be removed for cleaning, remove all valving as a complete assembly and place on a 5/16 x 3-in. cap screw to keep in the proper order. Note which side is the top side for assembly purposes.**

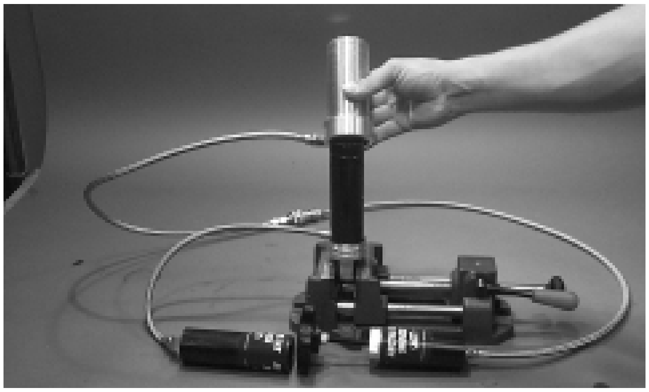
7. Remove the spiral retaining ring from the shock body; then remove the outer threaded sleeve.

Fig. 9-476



AG816

Fig. 9-477

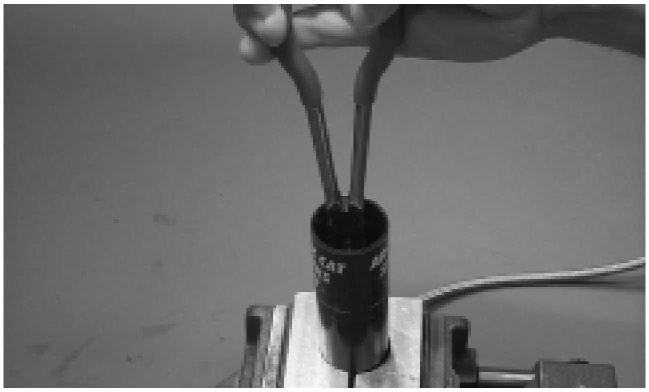


AG817

8. Pour out the excess oil from the shock body.

9. Using a long needle-nose pliers, remove the floating piston from the remote reservoir; then pour out the excess oil from the remote reservoir.

Fig. 9-478



AG818

Fig. 9-479



AG819

10. Clean the shock body, reservoir, and the outer threaded sleeve with parts cleaner.

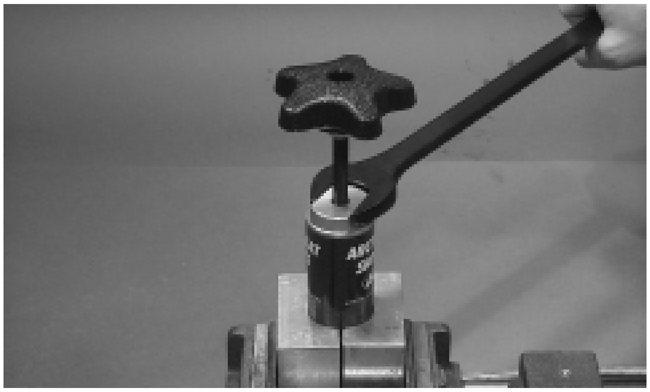
DISASSEMBLING/CLEANING/ ASSEMBLING ADJUSTER BODY

1. Disconnect the quick coupler.

9

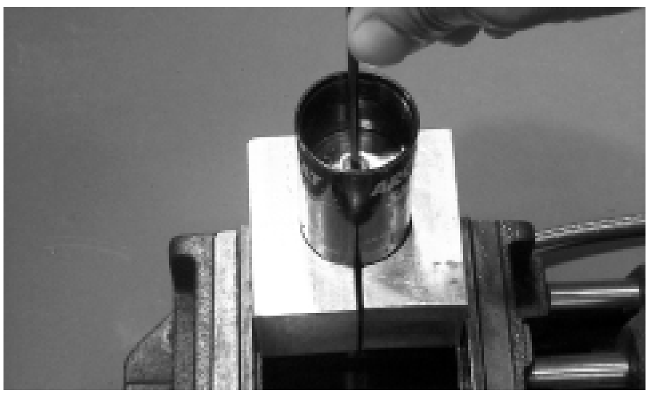
2. While securing the adjuster body in a vise with Shock Retaining Blocks (p/n 0644-142), remove the adjuster end cap; then remove the Allen-head screw from the center of the floating piston.

Fig. 9-480



AG820

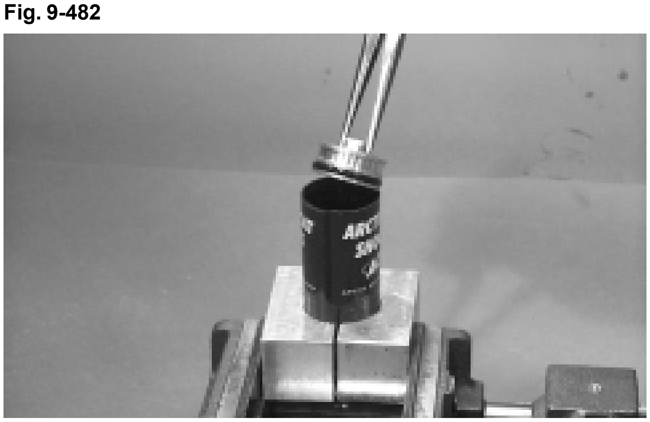
Fig. 9-481



AG821

3. Using a long needle-nose pliers, remove the floating piston from the adjuster assembly.

Fig. 9-482



AG822

4. Pour out the oil from the adjuster body.

5. Clean all components thoroughly; then use compressed air to dry.

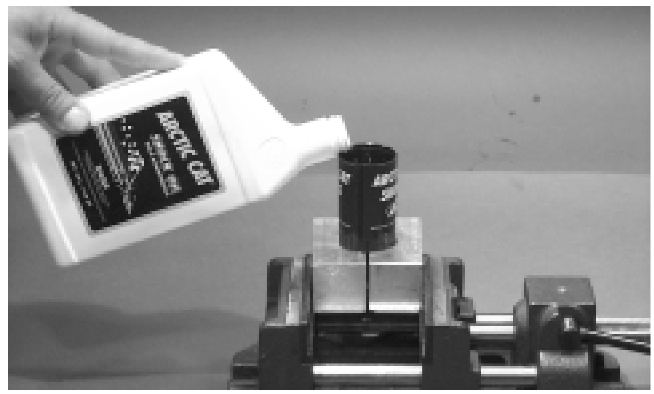
⚠ WARNING

When using compressed air, always wear a good pair of safety glasses.

6. Using the retaining blocks, secure the adjuster body in a vise.

7. Pour oil into the adjuster body until it reaches the bottom of the threads; then using a suitable tool, push in on the spring-loaded valve in the coupler assembly to remove any air in the coupler fitting and hose. Add oil to reach the bottom of the threads. Allow time for air bubbles to dissipate.

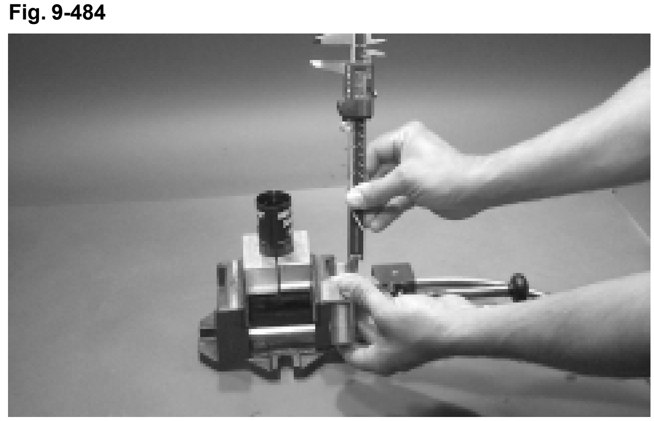
Fig. 9-483



AG823

8. Adjust the piston location tool to 13.2 mm (0.520 in.) for 1994-1996 models and to 16.8 mm (0.660 in.) for 1997-2000 models.

Fig. 9-484



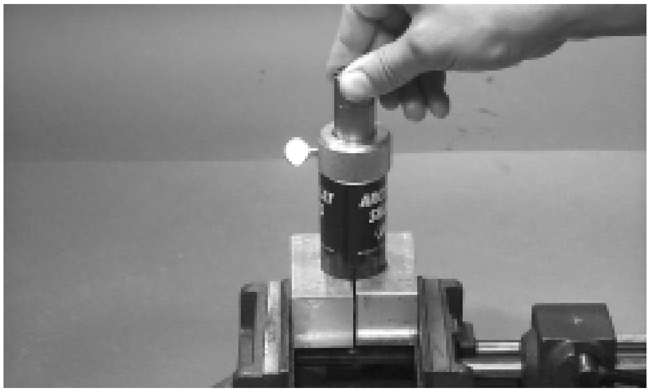
AG824

9. Using a good low-temperature grease, lightly grease the O-ring of the floating piston.

10. Using a long needle-nose pliers, insert the floating piston into the adjuster body until the piston is flush with the top of the body.

11. Using the piston location tool as a handle, push the piston down into the adjuster body until the adjustment stop of the tool comes in contact with the adjuster body. The piston should now be located correctly.

Fig. 9-485



AG825

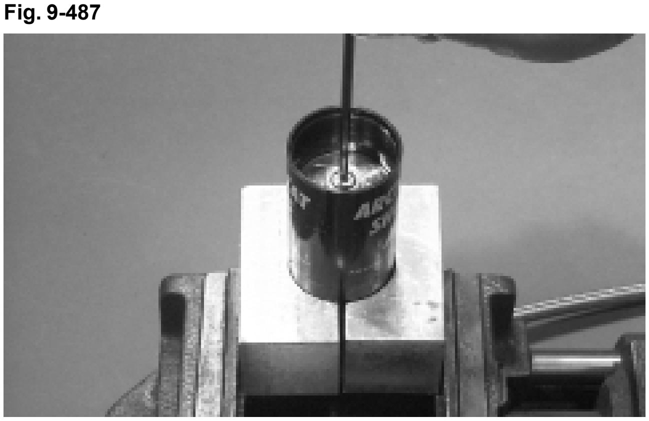
12. Install the Allen-head screw with a new O-ring into the floating piston; then tighten securely.

Fig. 9-486



AG826

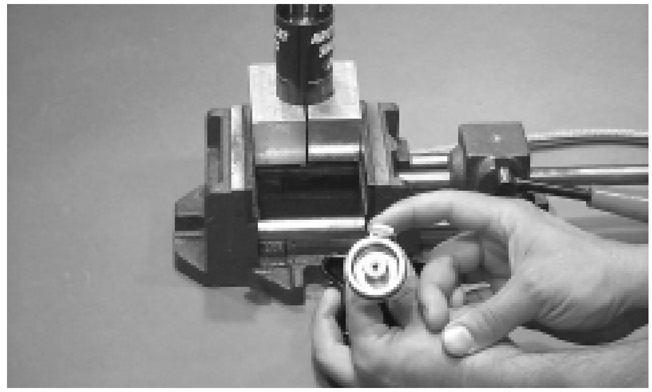
Fig. 9-487



AG827

13. Pour out the excess oil from the adjuster assembly; then grease the tip of the floating piston adjuster screw using a good quality grease.

Fig. 9-488



AG828

14. Install the adjuster handle making sure the handle is turned out (counterclockwise) completely. Tighten securely.

Fig. 9-489



AG829

Fig. 9-490



AG830

15. There must be a 1/4 to 1 turn of free-play on the handle. If handle free-play is not within specifications, repeat steps 7-11.

CLEANING AND INSPECTING

1. Inspect all hoses for cracks, kinks, or signs of damage; then clean all hoses and shock components of any contaminated oil.

2. Inspect all shock and reservoir surfaces for signs of damage.

■**NOTE: All cleaning fluids must be removed completely before assembling to avoid contamination of the oil.**

3. Inspect all O-rings for cracks or damage. It is recommended that all O-rings be replaced with new O-rings any time the shock is disassembled.

4. Clean all parts; then lay all parts on a clean newspaper.

ASSEMBLING SHOCK AND REMOTE RESERVOIR

■**NOTE: When assembling the shock, it is recommended to replace old O-rings with new O-rings. There is a Shock Rebuild Kit (p/n 0637-101) that contains all the necessary O-rings for rebuilding the front arm quick-adjust shock.**

1. Secure the shock body in a vise by the lower end cap eyelet.

2. Lightly grease the shock body and the O-rings on the outer threaded sleeve; then install the outer threaded sleeve making sure the fitting on the outer threaded sleeve aligns with the fitting on the shock body.

Fig. 9-491



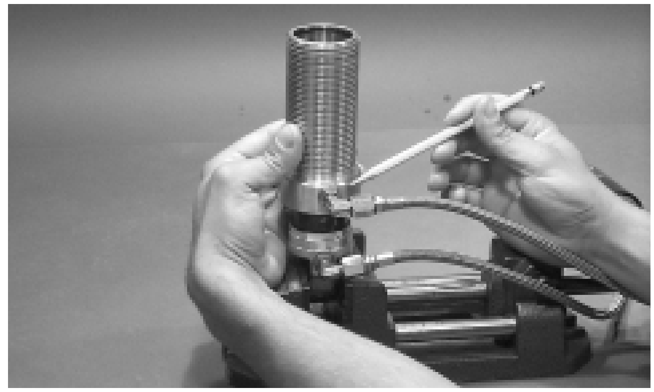
AG831

Fig. 9-492



AG832

Fig. 9-493

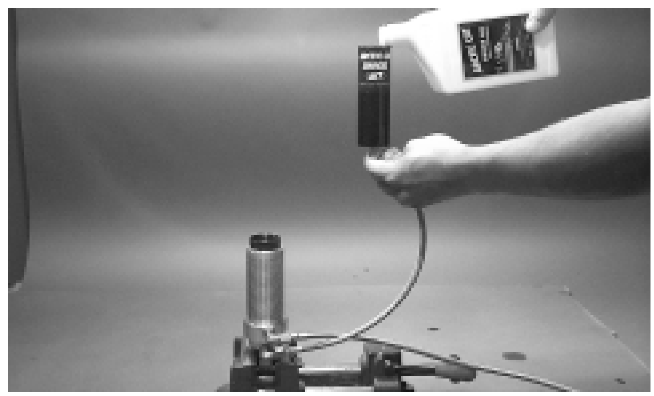


AG833

3. Install the spiral retainer on the shock body making sure the retainer seats in the retainer groove.

4. While holding the remote reservoir above the shock body with the hose free of any low spots, fill the remote reservoir with new shock oil until oil flows free of air bubbles into the shock body.

Fig. 9-494



AG834

5. Position the remote reservoir below the shock body; then fill the remote reservoir to the top with new shock oil. Allow time for air bubbles to dissipate.

6. Install the floating piston with the Allen-head screw installed in piston. Push piston in until flush with top of reservoir body; then let reservoir and hose hang down from shock for a few minutes to let any air work up and out of the shock. Push the floating piston all the way into the reservoir. The shock may overflow with oil. Pull the floating piston back 2 inches and push back down a couple of times while keeping the open end of the reservoir down and below the shock body. This will remove all the air from the reservoir and hose.

Fig. 9-495



AG849

■ **NOTE: Assembling this shock results in oil overflowing several times. This is necessary to remove air from the system.**

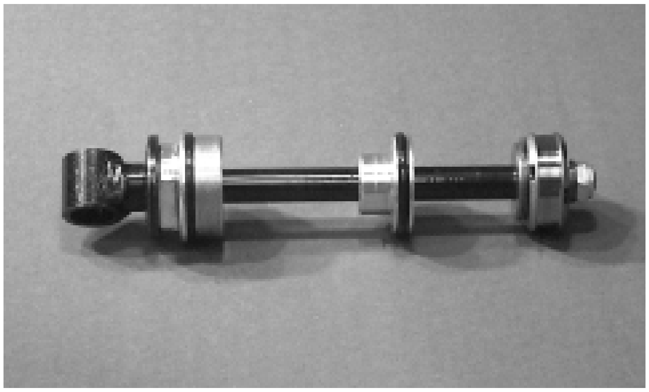
7. With the floating piston pushed to the bottom of the reservoir, finish filling the shock body with new shock oil to the bottom of the threads. Allow time for all air bubbles to dissipate; then angle the shock body slightly in the vise.

8. Lightly grease the threads of the shock body and the piston adjuster O-ring.

■ **NOTE: You may proceed with a few small air bubbles coming from the orifices near the top of the shock.**

9. Set the adjuster piston 1 to 1 1/2 in. from valving piston while holding the end cap at the top.

Fig. 9-496



AG835

10. To install the shock rod, align the valve piston wear ring end gap with the low-speed orifice cutaway positioning the cutaway so it faces the upward angle of the shock body which will allow air to escape. Install the valving piston by pushing on the shaft eyelet while guiding the piston ring into the shock body. Push the piston to bottom of the threads on the inside shock body.

Fig. 9-497



AG836

11. Allow air to dissipate; then stand shock straight up and fill with oil. Install adjuster piston by pushing down on adjuster piston until it is just past the orifice in the shock body.

Fig. 9-498



AG837

Fig. 9-499



AG838

■ **NOTE: When installing the adjuster piston, push down only on the adjuster piston. Do not push down on the shock eyelet.**

12. Pour oil into the coupler female end; then connect hose from the shock body to the adjuster assembly.

9

Fig. 9-500

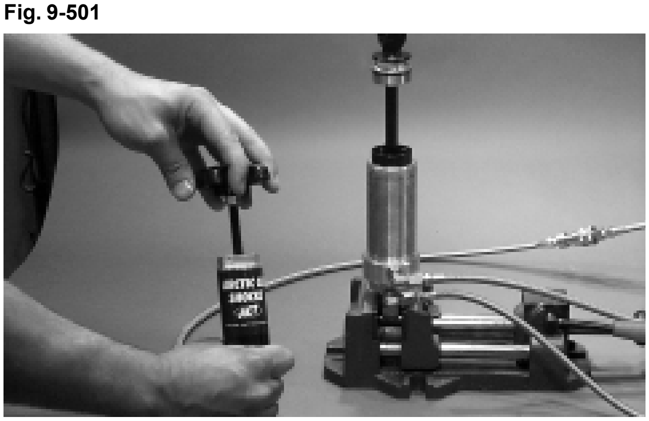


AG839

13. While keeping the adjuster and hose below the shock, turn the adjuster knob in (clockwise) until oil reaches the top of the shock body free of air bubbles; then back the adjuster knob off.

■ **NOTE: The adjuster knob must remain connected and backed out through the remaining procedure until the shock has been pressurized; otherwise, the oil will be trapped on top of the adjuster piston and the shock rod will appear to be short and the shock will not function properly.**

Fig. 9-501



AG840

14. While holding the shock eyelet to prevent the shock rod from moving, SLOWLY push down on the shock rod end cap; then slowly screw in shock rod end cap to allow air and oil to escape past the threads of the end cap. Tighten securely.

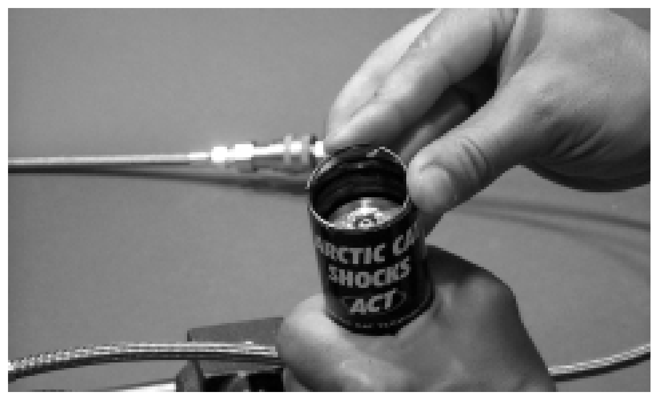
Fig. 9-502



AG841

15. Install the reservoir end cap into the remote reservoir; then install circlip. Pull out on the reservoir end cap to ensure that the circlip has been properly seated in its groove.

Fig. 9-503



AG842

Fig. 9-504

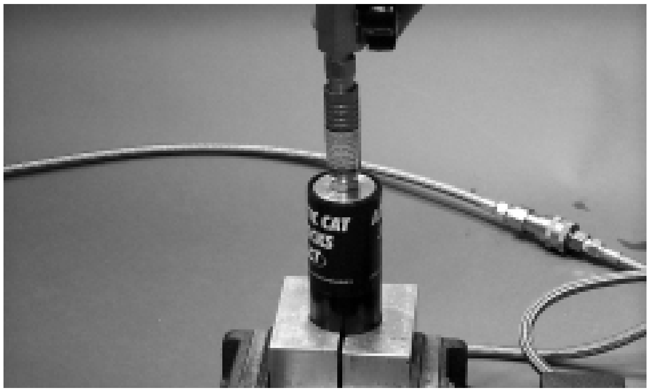


AG843

16. Pressurize the shock (refer to Pressurizing Rebuildable Shocks in this sub-section).

■ **NOTE: The shock must be pressurized and de-pressurized before an accurate piston depth measurement can be taken.**

Fig. 9-505



AG844

17. Test the shock by pushing down on the shock shaft until it bottoms; then release the shaft. The shaft should return smoothly to the extended position.

■ **NOTE: If a soft spot or a mushy area is felt as the shaft is pushed down, this would indicate air in the shock body. If there is air in the shock body, repeat the entire disassembly and assembly procedure.**

18. Clamp the remote reservoir upright in the shock blocks. Discharge all pressure from the reservoir. Push the remote reservoir end cap in and remove the circlip. Remove the remote reservoir end cap.

19. Measure the piston depth from the top of the reservoir body to the top of floating piston. Measurement should be between 76.20-88.90 mm (3.0-3.5 in.). If measurement is not correct, pour 1 inch of shock oil on top of the piston. Remove the Allen-head screw; then move the piston to the proper depth and install Allen-head screw with O-ring.

20. Pour out excess oil. Reinstall the end cap and circlips; then pressurize the shock.

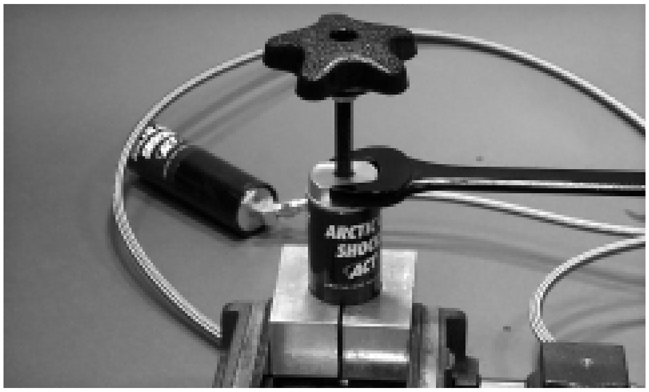
21. Install the valve screw in the end of the remote reservoir.

22. Disconnect the adjuster reservoir; then refill the adjuster reservoir.

FILLING ADJUSTER RESERVOIR

1. Remove the adjuster end cap; then remove the Allen-head screw from the center of the floating piston.

Fig. 9-506



AG845

Fig. 9-507



AG846

2. Remove the floating piston from the adjuster assembly.

Fig. 9-508



AG847

3. Pour oil into the adjuster body until it reaches the bottom of the threads. Allow time for all air bubbles to dissipate.

9

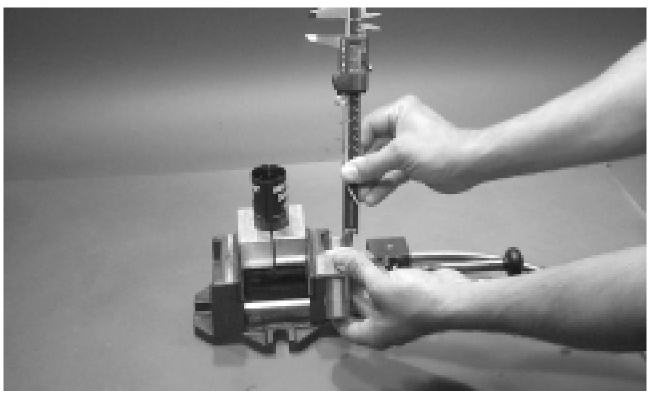
Fig. 9-509



AG848

4. Adjust the piston location tool to 13.2 mm (0.520 in.) for 1994-1996 models and to 16.8 mm (0.660 in.) for 1997-2000 models.

Fig. 9-510



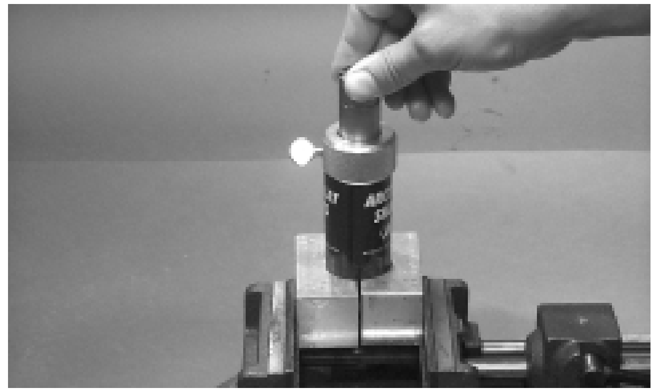
AG824

5. Using a good low-temperature grease, lightly grease the O-ring of the floating piston.

6. Using a long needle-nose pliers, insert the floating piston into the adjuster body until the piston is flush with the top of the body.

7. Using the piston location tool as a handle, push the piston down into the adjuster body until the adjustment stop of the tool comes in contact with the adjuster body. The piston should now be located correctly.

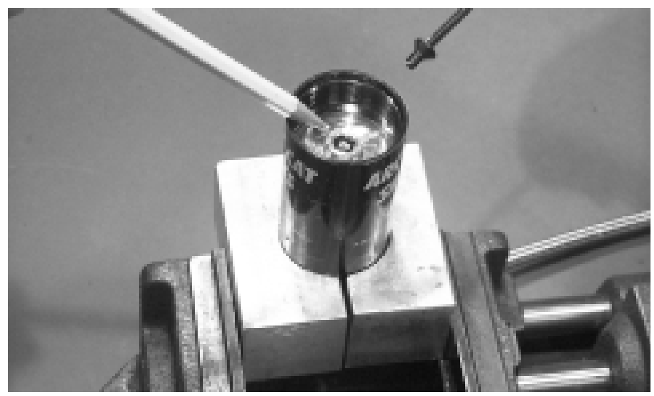
Fig. 9-511



AG825

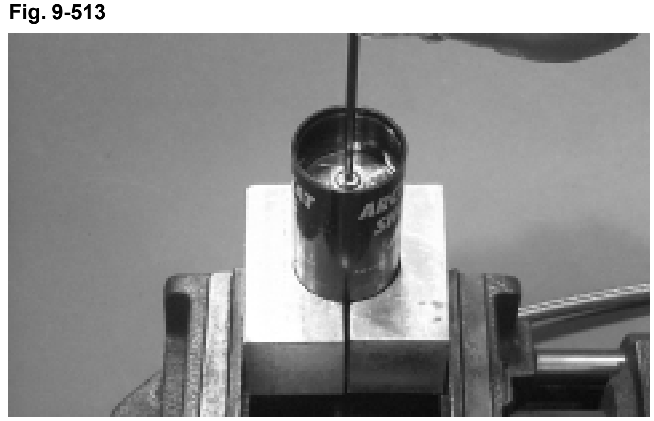
8. Install the Allen-head screw with a new O-ring into the floating piston; then while securing the piston with a 9/16-in. wrench, tighten the Allen-head screw.

Fig. 9-512



AG826

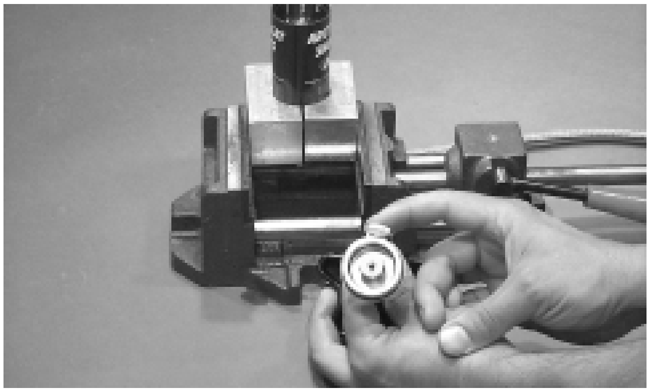
Fig. 9-513



AG827

9. Pour out the excess oil from the adjuster assembly; then grease the tip of the floating piston adjuster screw using a good quality grease.

Fig. 9-514



AG828

10. Install the adjuster knob making sure the knob is turned out (counterclockwise) completely. Tighten securely.

Fig. 9-515



AG829

Fig. 9-516



AG830

11. There must be a 1/4 to 1 turn of free-play on the knob. If handle free-play is not within specifications, repeat steps 1-10.

Installing Internal Travel Limiting Spacers

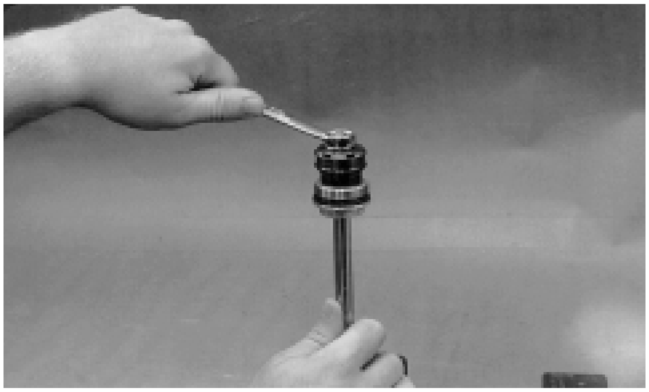
These spacers are used to shorten the travel of the shock absorber to fine tune the suspension to the operator's driving style.

If installing the spacers in the internal floating piston shock absorbers used on the 1992-2000 models, follow these steps.

1. Disassemble the shock absorber as covered in this manual.

2. Place the shock shaft eyelet into a vise and remove the nut securing the piston to the shock shaft.

Fig. 9-517



AP028

3. Carefully remove the piston and its valving plates stacked on either side of the piston from the end of the shock shaft.

■ **NOTE: When removing the piston and valve plates from the shock shaft, place the piston assembly on a 5/16 x 3-in. cap screw and secure with a nut to keep the assembly in its proper order.**

Fig. 9-518



AP032

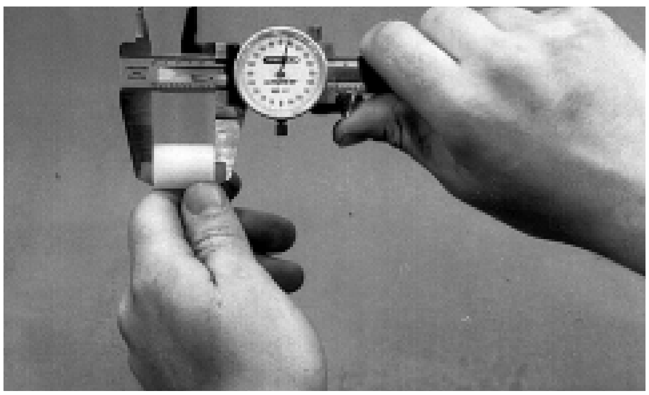
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■ **NOTE: If the piston assembly should become mixed, the large slots of the piston must be located next to the lock nut of the shaft. Refer to the appropriate Illustrated Parts Manual for valve plate location.**

■ **NOTE: If a rubber washer is found on the shock shaft next to the bottom side of the bearing cap, it must be removed before installing the limiting spacers. The rubber washer must not be used with the spacers installed.**

4. Measure the length of the limiting spacer(s) that are being installed on the shock shaft. Write down this measurement as it will be required to properly calculate the floating piston depth later in the assembly process.

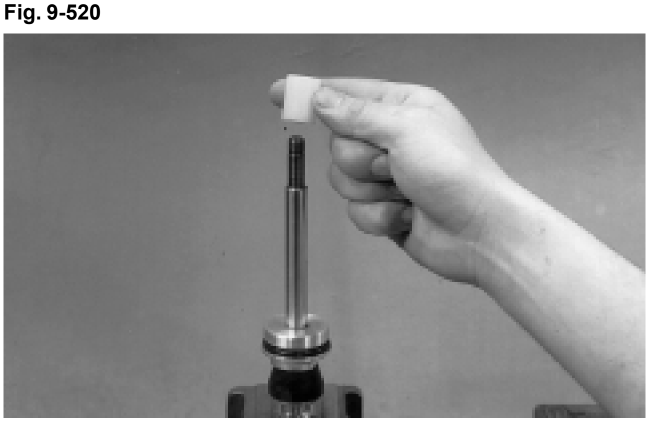
Fig. 9-519



AP053

5. Install the desired number of limiting spacers on the shock shaft.

Fig. 9-520

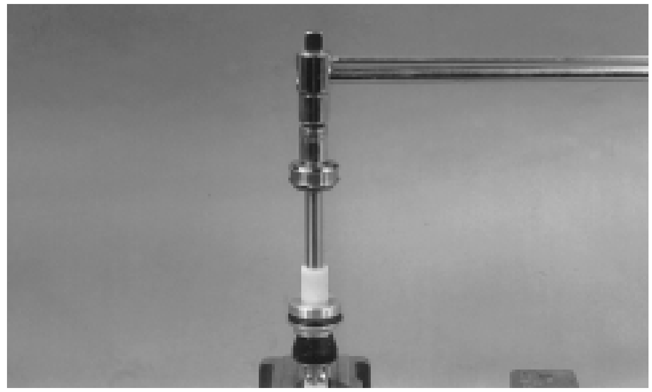


AP054

6. Install the heavy spacer washer and then the piston with valve plates located on either side onto the shock shaft. Check to make sure the piston has been installed with its large slots positioned next to the lock nut which secures the assembly to the shaft.

7. Install the lock nut and tighten to 2.1-2.8 kg-m (15-20 ft-lb).

Fig. 9-521



AP055

⚠ CAUTION

Do not over-tighten the lock nut. If excess torque is applied, damage to the piston and valves will occur.

■ **NOTE: For installing spacers on an IFP shock, proceed to step 8. For installing spacers on a remote reservoir shock, proceed to the appropriate assembly procedure for the type of shock being serviced.**

8. Apply a light coat of oil on the O-ring and piston ring. Install piston and the shock shaft assembly into the shock body.

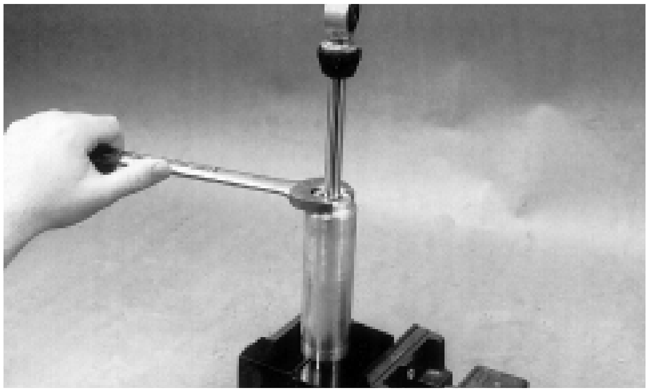
Fig. 9-522



AP033

9. Place the shaft bearing cap into the shock body and tighten securely.

Fig. 9-523



AP026

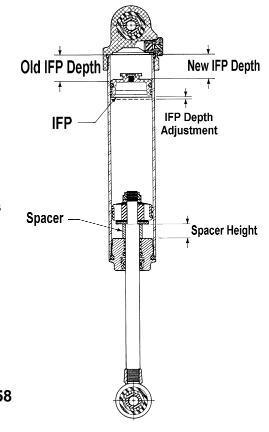
10. Remove the shock body from the vise and re-position the shock body and holding blocks in the vise so its open end is "up." Extend the shock shaft fully out; then fill the shock body with Shock Oil (p/n 0636-664) to within 1-in. from the top. Slowly stroke the shaft up and down to remove air from under the piston. Oil may need to be added to keep the shock full. Fill shock to within 1/4-in. from the top. Allow 5 minutes for all air bubbles to rise to the top.

■ **NOTE: Before installing the internal floating piston, refer to the illustration below and calculate the new piston depth using the measurement taken earlier of the spacer(s) installed and the formula provided in the illustration.**

Fig. 9-524

When using shock internal travel limiting spacers on rebuildable shocks with IFP's (Internal Floating Piston), the IFP depth setting must be reduced to compensate for the spacer height. Use the following formula to adjust your shock depth setting.

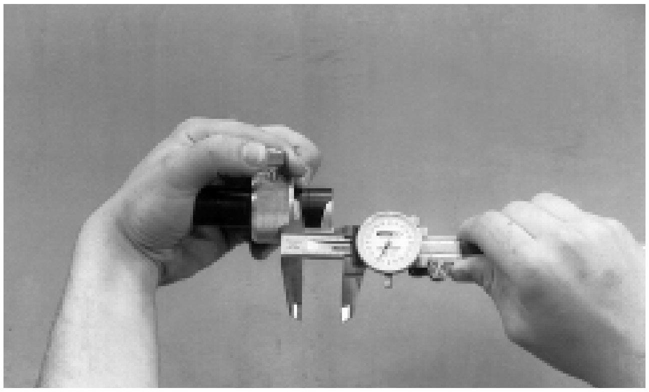
Example:
Spacer height = .500 in.
Old IFP depth = .750 in.
IFP Depth Adjustment = .1165 x .500 = .058
New IFP depth = .750-.058 = .692 in.



0730-266

11. After calculating the new piston depth, measure out this distance on the shock piston location tool; then adjust and secure the location knob.

Fig. 9-525



AP050

12. Apply a light coat of oil on the floating piston ring and O-ring and install the floating piston in the shock body.

Fig. 9-526



AG850

13. Using a long needle-nose pliers, insert the floating piston into the adjuster body until the piston is flush with the top of the body; then using the piston location tool as a handle, push the piston down into the adjuster body until the adjustment stop of the tool comes in contact with the adjuster body. The piston should now be located correctly.

Fig. 9-527



AG339

9

■ **NOTE: As the floating piston is pushed into the shock absorber body, air and excess oil will come out through the hole in the piston. If no oil comes out through the hole in the piston, remove the piston and add more oil to the shock body.**

14. Install the Allen-head screw and O-ring into the bottom of the floating piston. Tighten the Allen-head screw.

15. Pour out the excess oil from the shock body.

16. Install the lower end cap on the shock body.

17. Using Retaining Blocks (p/n 0644-142), hold the shock body in place and tighten the end cap using an adjustable wrench. Pressurize the shock following the shock pressurizing procedure.

Servicing Rebuildable Shocks, Remote Reservoir, & Remote Reservoir w/Clicker

⚠ WARNING

Before servicing a gas shock absorber, first discharge all pressure from the reservoir. Remove the screw from the top of the reservoir and insert the Shock Inflation Needle (p/n 0644-158). Open valve until all pressure is released. Failure to do this may cause personal injury.

REMOVING AND DISASSEMBLING

1. Remove the shock absorber from the snowmobile. Remove the mounting bushings and bearings from the shock.

2. Wash the shock body and reservoir in parts-cleaning solvent; then dry with compressed air to remove sand and dirt.

⚠ WARNING

When using compressed air to dry components, always wear safety glasses.

⚠ WARNING

When working with Shock Inflation Needle (p/n 0644-158), use extreme care. Misuse of this tool may cause personal injury or death. Avoid puncturing skin with needle. Pressurized air injected through the skin may be fatal. Do not release safety mechanism unless red nose piece is inserted in shock absorber air valve.

3. Remove the screw from the bladder housing on bottom of shock reservoir; then discharge all pressure from the shock reservoir using Shock Inflation Needle (p/n 0644-158). Open valve in filler handle until all pressure is released.

Fig. 9-528



AG851

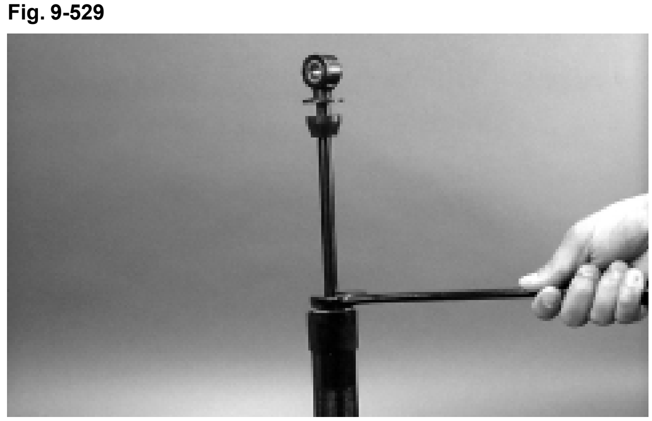
⚠ WARNING

Failure to remove pressure from shock reservoir may result in personal injury.

4. Clamp the shock body eyelet in a vise; then using a 1-in. wrench, unscrew the shaft bearing cover.

■ **NOTE: If the shock body turns in lower end cap, use shock blocks to hold the shock.**

Fig. 9-529



AG852

5. With the bearing cover loosened, lift the shaft assembly from the shock body.

Fig. 9-530

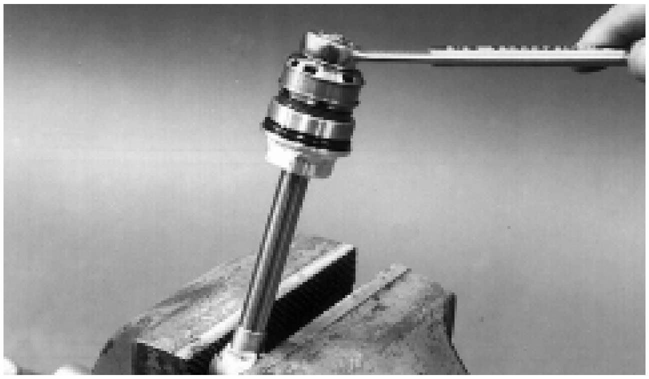


AG853

6. Remove the piston ring from the piston.

7. Loosen (BUT DO NOT REMOVE) the self-locking nut from the bottom of the shock shaft; then clean the piston area with clean parts cleaner to remove any dirt or foreign material from between the valves. Dry the piston and valves completely using compressed air. Tighten self-locking nut to 2.1-2.8 kg-m (15-20 ft-lb). Do not over-tighten! If excess torque is applied, the piston and valves will be damaged.

Fig. 9-531



AG280

■ **NOTE: Do not remove the self-locking nut from the bottom of the shock rod unless piston or piston valve changes are needed as it is very important the valving on either side of the piston stay in the proper position.**

8. Install the piston ring on the piston.

9. Push down on the reservoir end cap compressing it 2.5 cm (1-in.) into the reservoir; then remove the reservoir cap retainer ring. Use care not to scratch the inside of the reservoir.

Fig. 9-532



AG854

■ **NOTE: With the retainer ring removed, wipe the ring area clean to remove any foreign materials.**

10. Remove the reservoir end cap by grasping the bladder housing with a pliers and pulling the cap slowly out of the reservoir body.

Fig. 9-533



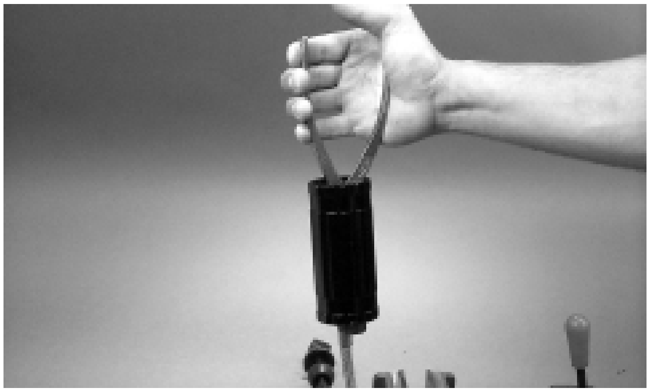
AG855

11. Remove the Allen-head screw and O-ring from the center of the piston. Remove the piston from the reservoir by grasping the raised area of the piston using a pliers. Pull the piston from the reservoir and account for the piston ring.

■ **NOTE: If the clicker adjustment assembly located at the opposite end of the reservoir shows no signs of oil leakage, removal of the assembly won't be necessary.**

9

Fig. 9-534



AG856

■ **NOTE: When servicing the clicker remote reservoir only, use new shock oil to flush out the shock and reservoir bodies; otherwise, residual parts-cleaning solvent may be trapped in the reservoir causing oil contamination.**

12. Pour the oil out of the shock and reservoir; then clean the inside of the reservoir and shock body using clean parts washer solvent. Blow dry using compressed air.

⚠ WARNING

When using compressed air to dry components, always wear safety glasses.

■ **NOTE: If the shock bearing cap does not show signs of leakage or damage, do not remove from the shaft.**

13. Inspect shock shaft for straightness, nicks, or burrs. Inspect shock and reservoir bodies for dents or scratches. Inspect piston valves for bending or cracking. Inspect all O-rings and seals for nicks, cuts, or cracking. Inspect rubber bottom-out bumpers for wear or damage. Replace any worn or damaged parts.

■ **NOTE: If changing or removing shock shaft, bearing cap, eyelet, or bottom-out bumper, refer to those sub-sections.**

ASSEMBLING

1. Place the shock into a vise at a slight angle and fill the shock reservoir with Shock Oil (p/n 0636-664).

Fig. 9-535



AG857

■ **NOTE: If filling shock with a remote reservoir, hold the reservoir lower than the shock. By holding the reservoir low as oil is added to the reservoir, air in the hose will be forced into the shock body and out of the system.**

2. With the Allen-head screw and O-ring installed in the reservoir piston and the reservoir full of shock oil, compress the piston ring into position with fingers and slowly push the piston down into the reservoir until the O-ring is down in the reservoir housing.

Fig. 9-536



AG858

3. Let the reservoir hang down for a few minutes to let air bubbles rise to the top and into shock body.

4. Rotate the clicker adjustment to the number one position; then using a clean pair of pliers, grasp the hex area at the center of the piston and slowly push the piston down into the reservoir until it bottoms in the reservoir. Once the piston has bottomed out in the reservoir, slowly pull up on the piston approximately ½ in. Next, slowly push the piston back down until it once again bottoms. Repeat this procedure several times until no air bubbles are seen rising in the oil in the shock body.

Fig. 9-537

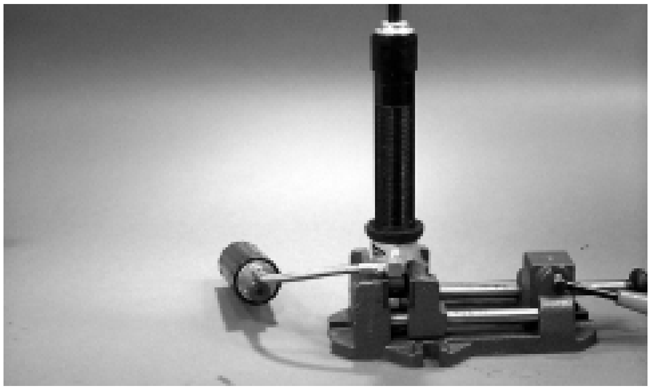


AP108

■ **NOTE: The oil in the reservoir will remove any air in the hose or passageway between the reservoir and shock body.**

5. Once all air has been removed from the reservoir body, bottom the piston in the reservoir and then pull the piston upward approximately 1/8 in. Rotate the clicker knob to number eight; then allow the reservoir to hang down below the shock absorber in the vise to permit any air that might remain in the reservoir to rise into the shock body.

Fig. 9-538



AG859

6. Install the reservoir end cap and O-ring down into the reservoir approximately 2.5 cm (1 in.). Install the retainer ring making sure it is firmly in place.

Fig. 9-539



AP011

7. Grasp the bladder housing with a pliers and pull it up into place against the retainer ring.

8. Slowly pour oil into the shock body until it is 1/4 in. from the top of the shock body. Again, allow five minutes to elapse before proceeding.

9. Space the bottom edge of the bearing cap approximately 1/2 to 1 in. away from the piston assembly.

10. To install the shock rod, align the valve piston wear ring end gap with the low-speed orifice cutaway positioning the cutaway so it faces the upward angle of the shock body which will allow air to escape.

Fig. 9-540



AG860

11. Compress the piston ring into position with fingers and slowly start the piston assembly down into the shock body.

Fig. 9-541



AG853

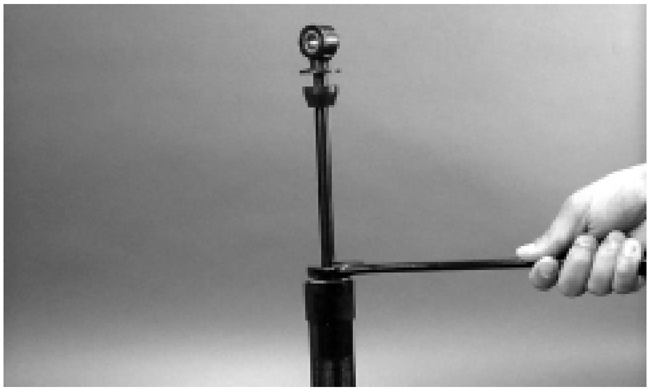
12. Give the end of the shock rod a few light taps with the palm of the hand to help release air bubbles from the piston valves.

■ **NOTE: Be careful not to damage the piston ring and watch that the piston ring ends are overlapped and in place as the piston is installed.**

9

13. Install the end cap very slowly to allow excess air and oil to come out the threads; then using a 1-in. wrench, tighten the bearing cap firmly down in place. **Do not push down on the shock shaft until the reservoir has been pressurized.** Pressurize the reservoir.

Fig. 9-542



AG852

14. Discharge all pressure from the shock reservoir using Shock Inflation Needle (p/n 0644-158). Open valve in filler handle until all pressure is released.

15. Push down on the reservoir end cap compressing it 2.5 cm (1 in.) into the reservoir; then remove the reservoir cap retainer ring. Use care not to scratch the inside of the reservoir.

16. Measure the piston depth from the top of the reservoir body to the top of the floating piston. Measurement should be between 31.75-36.83 mm (1.250 - 1.450 in.). If measurement is not correct, pour 1 inch of shock oil on top of the piston. Remove the Allen-head screw; then move the piston to the proper depth and install Allen-head screw with O-ring.

17. Install the reservoir end cap and O-ring down into the reservoir approximately 2.5 cm (1 in.). Install the retainer ring making sure it is firmly in place.

18. Pressurize the reservoir.

19. Install the shock mounting bushings and bearings in eyelets. If clicker shocks, set back to desired setting.

Bearing Cap and Shaft Seal

REMOVING AND DISASSEMBLING

1. With shaft assembly removed from shock body, clamp shaft eyelet in vise and remove the lock nut.

Fig. 9-543



AP028

2. Lift the piston valve assembly.

■ **NOTE: When removing the piston and valve plates from the shock shaft, place the piston assembly on a 5/16 x 3-in. cap screw and secure with a nut to keep the assembly in its proper order.**

Fig. 9-544



AP032

3. Remove the bearing cap (on front arm adjuster shocks, remove the adjuster piston and a spacer washer first).

4. Remove the outer plastic wiper; then remove the inner rubber wiper from the bearing cap.

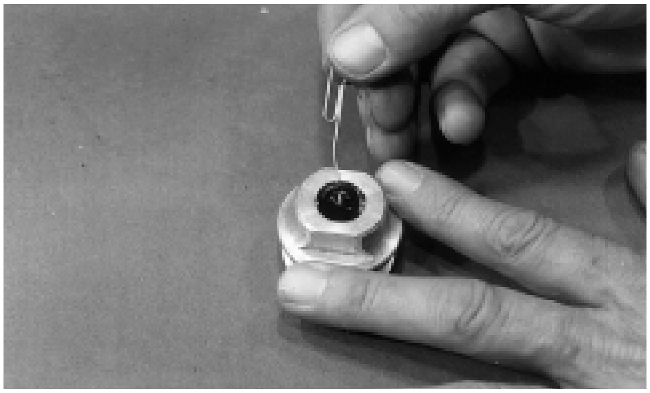
Fig. 9-545



AG257

5. Using a small paper clip bent on one end, remove the inner O-ring.

Fig. 9-546

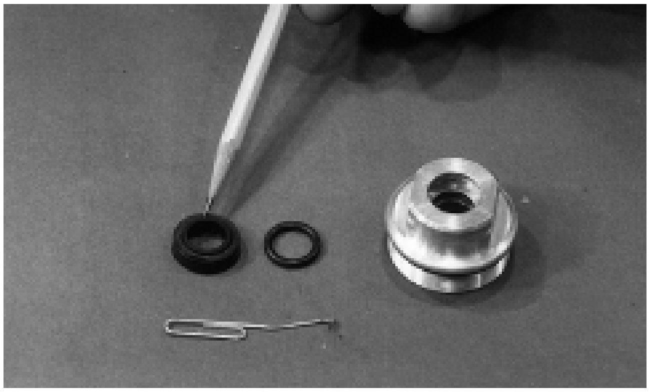


AG258

ASSEMBLING AND INSTALLING

1. Install new O-ring and inner rubber wiper into the shaft bearing cap; then install outer plastic wiper.

Fig. 9-547

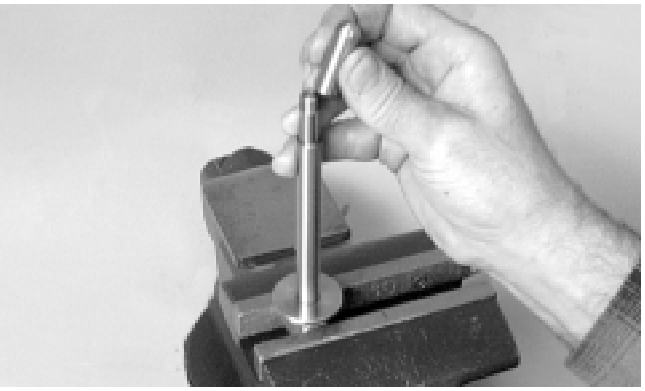


AG259

2. Inspect the shoulder or step of the shaft for sharp edges or a burr. Smooth up with #400 grit sand paper or emery cloth.

3. Put Bearing Cap Installation Tool (p/n 0644-268) over the threaded end of the shaft.

Fig. 9-548



AP114DA

4. Put a small amount of light grease on the seal and slide the bearing cap over the tool and onto the shaft.

Fig. 9-549

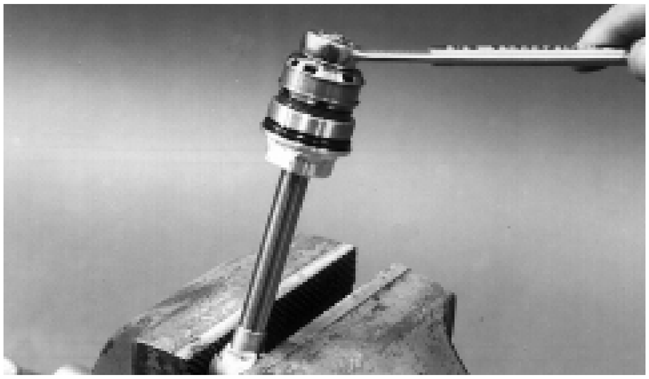


AP115DA

5. On a front arm adjuster shock, install the spacer washer on shaft and install adjuster piston in the same manner as bearing cap; then remove the installation tool.

6. Install piston valve assembly. Tighten the self-locking nut to 2.1-2.8 kg-m (15-20 ft-lb).

Fig. 9-550



AG280

9

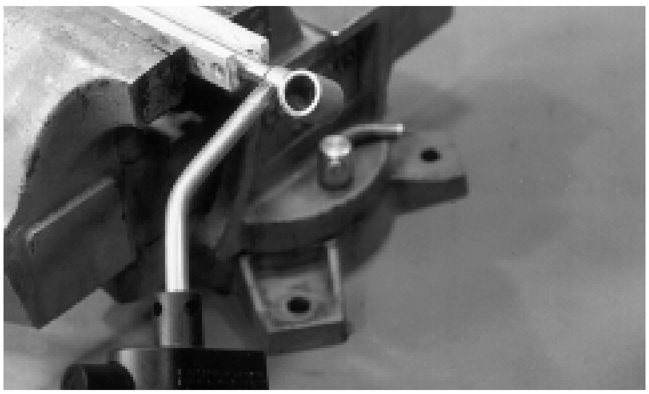
Shaft Eyelet

REMOVING

1. Using Shock Rod Clamping Tool (p/n 0644-277) to prevent damage to the shaft surface, place the shock shaft into a vise.

2. Heat the shaft eyelet with a torch to soften the Loctite.

Fig. 9-551



AG260

■ **NOTE: The eyelet must be heated up to 300° for the Loctite to soften.**

3. Using a wrench, unscrew the eyelet from the shaft.

Fig. 9-552



AG261

INSTALLING

1. Clean shaft threads and eyelet threads. Apply red Loctite to both threads and tighten securely.

Ski Shocks Bottom-Out Bumper

Bottom-out bumper can be replaced by removing shock eyelet or by removing piston valving assembly and bearing cap.

Pressurizing Rebuildable Shocks

To pressurize the gas shock absorber, a regulator system and a nitrogen tank will be needed.

Fig. 9-553



AG271

⚠ WARNING

Never have a nitrogen bottle in the shop without having it chained or secured. If the bottle should tip over and the regulator break off, the gas inside it is under 1800 lb of pressure and personal injury may result.

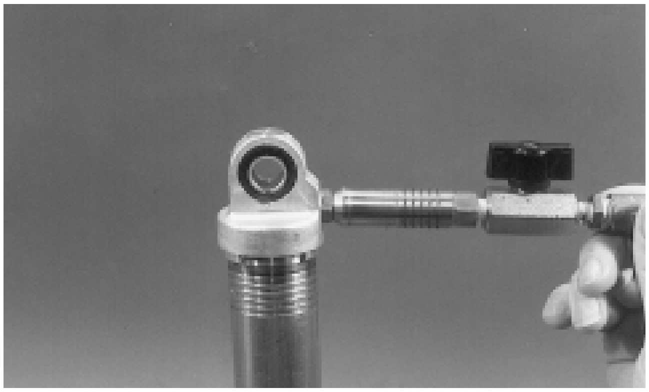
⚠ WARNING

Always rotate the regulator T-handle to its loose position each time when finished using the system. Each time before the nitrogen tank valve is opened, check to make sure the regulator T-handle is turned out. When opening the nitrogen tank valve, never stand in front of the regulator in case there should be a problem.

■ **NOTE: Before inserting the needle into the bladder, lubricate the needle with light oil to make installation easier.**

1. Insert the Shock Inflation Needle (p/n 0644-158) into the shock bladder; then open the valve on the filler handle.

Fig. 9-554



AG335

2. Turn the nitrogen tank valve open and slowly rotate the regulator T-handle inward until the gauge reads 200 lb of pressure; then close filler valve and remove inflation needle.

■ **NOTE: On remote reservoir shocks, use a needle nose vise grips to hold the bladder housing to keep the end cap from pushing into the reservoir when inserting the inflation needle.**

Fig. 9-555



AG851

3. Install the screw into the bladder housing and tighten securely.

4. With the reservoir pressurized, push down on the shock shaft until it nearly bottoms and release it. The shaft should return to its extended position smoothly.

■ **NOTE: If a soft spot or a mushy area is felt as the shaft is pushed down, this would indicate air in the shock body. If there is air in the shock body, discharge the reservoir gas pressure. Disassemble the shock to the point that the "filling with oil" and the "bleeding air" procedures can be redone. Assemble and repeat the pressurizing procedure. To test the shock absorber for nitrogen gas leaks, submerge in water.**

Troubleshooting Track

Problem: Track Edge Frayed—Drive Lugs Worn	
Condition	**Remedy**
1. **Track alignment** adjusted incorrectly	1. Align—replace track

Problem: Track Worn Adjacent to Outer Drive Lugs	
Condition	**Remedy**
1. **Track tension** adjusted incorrectly	1. Adjust track tension
2. **Rear idler wheels** dirty—damaged	2. Clean—replace idler wheels

Problem: Track Ratchets—Slaps Tunnel	
Condition	**Remedy**
1. **Track tension** adjusted incorrectly (too loose)	1. Adjust track tension (tighten)
2. **Drive sprockets** misaligned—damaged	2. Align—replace sprockets

Problem: Wear-Strip Wear Excessive	
Condition	**Remedy**
1. **Slide rail** bent—broken—damaged	1. Repair—replace slide rail
2. **Track alignment** adjusted incorrectly	2. Adjust track alignment